SYMPTOM DIMENSIONS OF DEPRESSION OVER THE COURSE OF

TREATMENT: AN APPLICATION OF THE TRIPARTITE MODEL

By

Sabine P. Schmid

Dissertation

Submitted to the Faculty of the

Graduate School of Vanderbilt University

in partial fulfillment of the requirements

for the degree of

DOCTOR OF PHILOSOPHY

in

Psychology

August, 2005

Nashville, Tennessee

Approved:

Professor Steven D. Hollon

Professor Andrew J. Tomarken

Professor Richard C. Shelton

Professor Jo-Anne Bachorowski

Professor Jeffery J. Franks

ACKNOWLEDGEMENTS

First and foremost, I want to thank Dr. Steven Hollon, the chairman of my dissertation committee, for his continuous and unlimited support throughout the completion of this project. As my academic advisor and mentor in graduate school, Steve has taught me more than I could ever express here. Primarily, he has shown me what a good clinical scientist should be.

My dissertation is based on data from a larger project on treatment for depression. I want to thank Dr. Steven Hollon, Dr. Robert DeRubeis, and colleagues for providing me with the opportunity to participate in this project and for allowing me to use the study data for my dissertation.

My special thanks go to Dr. Andrew Tomarken, whose statistical guidance was crucial in the development and completion of this project. Moreover, Andy has greatly influenced my professional development as a scientist by being an exceptional teacher and in many challenging and inspiring discussions.

I also want to thank my other (current and previous) committee members, Dr. Jo-Anne Bachorowski, Dr. Jeffery Franks, Dr. Ann Kring, and Dr. Richard Shelton. Each of them has provided me with professional guidance and has significantly advanced my ability to think and write scientifically.

I am proud to have been a member of the outstanding clinical research team at the Vanderbilt University Adult Psychiatry Unit. I am grateful to all of my colleagues with whom I had the pleasure to work during this and other projects. In particular, I want to thank Dr. Kirsten Haman, Margaret Lovett, Cathryn Freid, Dr. Laurel Brown, and

Dr. Dorothy Tucker for their help and feedback on this study as well as for their

unconditional support and friendship.

 Finally, I want to thank my beloved family in Germany for believing in me

throughout these years and for their unwavering emotional support and encouragement.

TABLE OF CONTENTS

Appendix

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

Effectiveness of depression treatment varies considerably among individuals. This is not surprising given the complexity and heterogeneity of depression. For instance, common presentations of depression include symptoms ranging from psychomotor retardation to high levels of restlessness and agitation. Yet, it remains challenging to effectively and efficiently predict what treatment will work best for which patient.

Certain symptoms and symptom clusters (i.e. symptoms which tend to co-occur) have shown predictive value in the past. For instance, depression involving significant anxiety symptoms such as worry or physiological arousal symptoms may require different treatment than depression without those features (e.g., Fawcett, 1997; Grunhaus, Harel, Krugler, Pande & Haskett, 1988). There is evidence that the melancholic depression subtype – i.e. the cluster of symptoms including flat affect, anhedonia, psychomotor retardation, lack of appetite, etc. – responds better to a tricyclic antidepressants than to monoamine oxidase inhibitors (MAOIs) or selective serotonin reuptake inhibitors (SSRIs) (e.g., Danish University Antidepressant Group, 1986; Roose, Glassman, Attia & Woodring, 1994; Perry, 1996), while the atypical subtype – including symptoms such as mood reactivity, increased appetite, etc. – shows the reverse pattern (e.g., Pande, Birkett, Fechner-Bates, Haskett & Greden, 1996; Quitkin, Stewart, McGrath, Tricamo, Rabkin et al., 1993). Previous research in this area involved mainly pharmacological studies and there have been significant inconsistencies in findings among these trials. Many questions remain regarding the potential of depression symptom clusters as predictors of

treatment response. Additionally, prior research in this area has not always been guided by theoretical models.

In the present study, the tripartite model (Clark & Watson, 1991) will be used as a framework for investigating depression symptom clusters as predictors of treatment response. The tripartite model categorizes symptoms of anxiety and depression into those unique to each phenomenon versus those shared by both.

Negative Affect (NA) and Positive Affect (PA)

The constructs of Negative Affect (NA) and Positive Affect (PA) play a central role in the tripartite model. These constructs will therefore be introduced and their relation to anxiety and depression addressed, before focusing in more detail on the tripartite model symptom clusters. Unlike the term *emotion*, which often refers to a complex and multimodal construct with subjective, physiological and expressive/behavioral components, the term *affect* is commonly used to denote subjectively experienced feelings (Watson & Vaidya, 2003). This study will focus on *state affect*, which refers to a transient episode of experienced feelings and is distinguished from *trait affect*, which refers to stable individual differences in experienced feelings (Watson & Vaidya).

There are a number of dimensional and discrete models of the structure of affect (e.g., see Feldman Barrett & Russell,1998; Keltner & Ekman, 2000; Watson & Tellegen, 1985; Watson & Vaidya, 2003). As Watson and Vaidya (2003) point out, these do not have to be mutually exclusive, but may reflect different levels of specificity in the description of affect. In the context of this study, however, affect will be approached exclusively from a dimensional perspective. Research on affect involving self-reports, facial and/or vocal expression of emotion, and semantic differential ratings of affect words, most strongly

2

support a two-factor structure of affect (see Watson & Vaidya, 2003; Watson & Tellegen, 1985).

In the past, researchers have emphasized the two dimensions of Pleasantness (i.e. *valence*) and Activation (i.e. *arousal*) as being core to the description of affect. Larsen and Diener (1992), for example, proposed that the two bipolar dimensions Pleasantness (pleasant versus unpleasant) and Activation (high versus low activation) are orthogonal and define a space in which affect terms can be placed based on their degree of pleasantness and activation. As can be seen in Figure 1, NA and PA are basically another conceptualization of the same affect space (e.g., Larsen & Diener, 1992; Watson & Tellegen, 1985; Watson, Wiese, Vaidya & Tellegen, 1999). In the two-factor affective model by Watson and Tellegen (Tellegen, 1985; Watson & Tellegen, 1985), these two bipolar axes represent the two basic dimensions of affect.
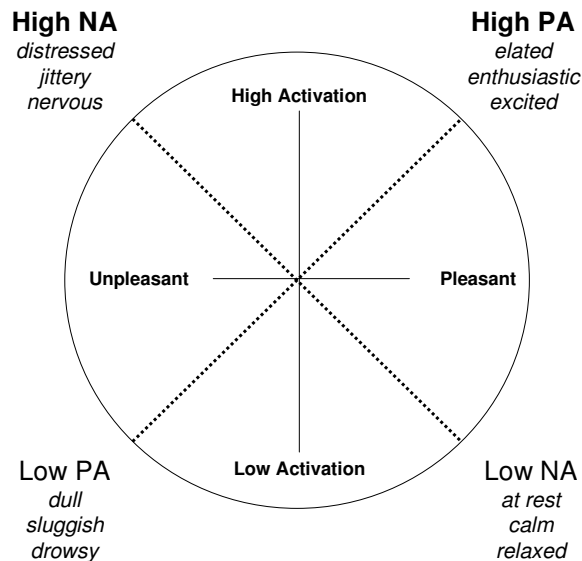
Figure 1. Two-Factor Structure of Self-Reported Affect (adapted from Watson &Tellegen, 1985)

3

Although the labels Negative Affect and Positive Affect appear to refer to valence only, NA and PA are described in terms of both valence and arousal (see Figure 1). High NA and high PA, for example, share a component of high activation, but are of opposite valence. According to Watson, Clark and Carey (1988), high NA "is a general factor of subjective distress, and subsumes a broad range of negative mood states, including fear, anxiety, hostility, scorn, and disgust" (p.347). Low NA is the absence of negative activation (i.e. a state of relaxation and calmness). PA refers to "one's level of pleasurable engagement with the environment" (Watson et al., p.347). A state of high PA can be described as enthusiastic, energetic and interested, whereas low PA would refer to a state of fatigue and lethargy.

It should be noted that the schema presented in Figure 1 is used for illustration purposes and that implications regarding the structure of affect need to be treated with caution. PA and NA, for example, are depicted as 45 ° rotated from the Activation and Pleasantness axes, which technically implies a set of specific correlations between the axes. Instead, however, there is some evidence for significant deviation from the correlations expected from this model. Activation, for example, may be more closely related to high PA than to high NA (Watson, Wiese, Vaidya & Tellegen, 1999). More importantly, high PA and high NA, which according to this model are expected to be uncorrelated, have been shown consistently to be moderately negatively correlated (e.g., Brown, Chorpita & Barlow, 1998; Feldman Barrett & Russell, 1998; Tellegen, Watson & Clark, 1999; for a discussion of the structural properties of affect, see Watson et al., 1999).

One of the most commonly used measures of PA and NA, which was also used in the present study, is the Positive and Negative Affect Scale (PANAS), a 20-item self-report

measure developed by Watson, Clark and Tellegen (1988). The PANAS is based on the 2-factor affect model and contains two scales assessing high PA and high NA (see Table 1 for a list of the items). Different versions of the PANAS have been created in order to address different time frames. In the "current" version, participants are asked how they currently feel and in the "week" version, participants are asked how they felt over the past week. In the "trait" version, participants are asked how they feel in general. Trait NA refers to an individual's stable disposition to experience aversive mood states including anger, fear and guilt; trait PA refers to an individual's stable tendency to experience such states as cheerfulness and enthusiasm.

NA and PA in Depression

There is strong support for the notion that depression involves a combination of high NA and low PA (e.g., Brown et al., 1998; Clark & Watson, 1991; Clark, Watson & Mineka, 1994; Tellegen, 1985; Watson, Clark & Carey, 1988). Although some of the studies (e.g., Brown et al., 1998; Watson, Clark & Carey, 1988) have used trait rather than state measures of NA and PA, results still argue for the involvement of high state NA and low state PA in depression as the affect states have been shown to be significantly correlated with their trait equivalents (Watson, Clark & Tellegen, 1988).

Watson, Clark and Carey (1988), for instance, tested the association of trait NA and PA (assessed by the Multidimensional Personality Questionnaire; Tellegen, 1982) with anxiety and depression symptoms and diagnoses. Their sample included 150 inpatients and outpatients diagnosed with at least one anxiety (social phobia, simple phobia, obsessive compulsive disorder, or panic/agoraphobia) or depression disorder (major depression or dysthymia) according to the Diagnostic and Statistical Manual of Mental

5

Disorders, third edition (DSM-III; American Psychiatric Association [APA], 1980).

They found that high trait NA was related to a wide range of individual anxiety and depression symptoms. High trait NA was also related to the severity of anxiety symptoms (correlation coefficients ranged from .25 to .37 depending on the category of anxiety symptoms) and severity of depression symptoms (.57). Low trait PA, on the other hand, was more consistently related to depression symptoms than to anxiety symptoms, and it had a stronger association with depression symptom severity (-.40) than with anxiety symptom severity (all indices smaller than -.16). Watson and colleagues concluded that high trait NA may be common to both anxiety and depression, while low trait PA may be specific to depression.

The Tripartite Model

Based on these and other research findings, the tripartite model (e.g. Clark & Watson, 1991) posits that NA is shared by anxiety and depression and low PA is specific to depression. This model expands these two affect components by including other non-affective symptoms, and adding a third component, which represents symptoms specific to anxiety.

According to Watson, Clark and colleagues (e.g. Clark & Watson 1991, Watson et al., 1995a) symptoms shared by anxiety and depression disorders include symptoms associated with high NA such as nervousness or being upset, and other general distress symptoms such as difficulty concentrating. Symptoms specific to depression include those associated with low PA such as the absence of liveliness and the lack of enthusiasm and interest. The anxiety-specific cluster contains somatic anxiety symptoms such as tachycardia, sweating, or muscle tension.

The tripartite model structure is in large parts based on factor analytic work, particularly by Watson, Clark, and colleagues. Watson and colleagues (Watson et al., 1995a, b) have explored the factor structure of anxiety and depression symptoms across five samples including patient and non-patient participants. Factor analysis on 90 symptoms associated with depression and/or anxiety supported a three-factor solution highly consistent with the tripartite model. The first factor included symptoms of general distress and high NA (hereafter referred to as GD), the second factor contained symptoms of anhedonia and low PA (hereafter referred to as ANH) and the third factor consisted of symptoms of somatic anxiety (hereafter referred to as SA) (Watson et al., 1995a). It should be noted, however, that not all of the factor analytic findings were entirely consistent with the model. Most notably, several items reflecting loss of interest such as "felt bored" and "took extra effort to get started" which are conceptually more consistent with the ANH dimension, actually loaded higher on the GD dimension.

It is also noteworthy that these factors are not expected to be strictly independent. Studies involving the PANAS in clinical (e.g., Brown et al., 1998) and non-clinical populations (e.g., Feldman Barrett & Russell, 1998; Tellegen, Watson et al., 1999, Watson et al., 1995b) have found moderate negative correlations between NA and PA (ranging from -.36 to -.46). Factor-analytic studies on the tripartite model structure involving both clinical and non-clinical populations greatly varied with regard to reported correlations between the factors. Correlations were all positive and coefficients varied from (a) moderate to high for GD/NA versus ANH (ranging from .49 to .84), (b) moderate to high for GD/NA versus SA (ranging from .50 to .72) and (c) low to high for SA versus ANH (ranging from .23 to .72) (Brown et al., 1998; Joiner, 1996; Joiner, Steer, Beck, Schmidt, Rudd & Catanzaro, 1999; Lambert et al., 2004; Watson et al.,

1995b). Sample characteristics as well as statistical methods appear to play a major role in the variability between studies in this respect. For example, higher levels of pathology tended to be associated with higher correlations between the symptom components.

It is important to note that the tripartite model represents one of many possible ways to define separable symptom dimensions of depression and anxiety. In order to evaluate the validity of the tripartite model, the goodness-of-fit of this model must be tested against the goodness-of-fit of alternative models. Recently, there has been a growing interest in this topic and several empirical studies have attempted to explore the validity of the tripartite model structure, across a variety of populations. Most studies provide at least some support for the tripartite structure over other factor models in a variety of adult outpatient samples (e.g., Clark, Steer & Beck, 1994; Joiner, 1996; Joiner, Catanzaro & Laurent, 1996; Marshall, Sherbourne, Meredith, Camp & Hays, 2003; Steer, Clark, Beck & Raniery, 1995), in older adult outpatients (Cook, Orvaschel, Simco, Hersen & Joiner, 2004), and in children / adolescent samples (Chorpita, B., 2002; Jacques & Mash, 2003; Lambert, McCreary, Joiner, Schmidt & Ialongo, 2004; Turner & Barrett, 2003).

Relatively few studies have provided direct evidence against the three-factor structure. Burns & Eidelson (1998) analyzed data obtained from a mixed outpatient sample (N = 483). For their analyses, they selected items from the Beck Depression Inventory (BDI; Beck & Steer, 1987), the Burns Anxiety Inventory (Burns, 1989), and the Symptom Checklist–90 (Derogatis, Rickels, & Rock, 1976). Using structural equation modeling, the authors directly compared two models with the three-factor structure of the tripartite model (with factors anhedonia, negative affect, and somatic anxiety). The first model was a four-factor model with the factors anhedonia, somatic anxiety, non-specific depression, and non-specific anxiety. The second model was a

8

second-order factor model with the four factors from the previous model serving as first-order factors and two additional factors serving as second-order factors. One of these second-order factors, named depression, represented shared variance of the factors anhedonia and non-specific depression; the other, named anxiety, represented the shared variance of the factors somatic anxiety and non-specific anxiety. The authors found both of these models to be significantly superior to the three-factor model.

An exploratory factor-analytic study by Riskind, Beck, Brown, and Steer (1987) involving the Hamilton Rating Scale for Depression (HRSD; Hamilton, 1960) and the Hamilton Rating Scale for Anxiety (HRSA; Hamilton, 1959). The authors derived a two-factor structure, reflecting depression and anxiety, and found that several items from the HRSD loaded higher on the anxiety factor than on the depression factor and some HRSA items showed the opposite pattern. Unfortunately, this two-factor model was not compared to alternative models. Further, utilizing the BDI and the Beck Anxiety Inventory (BAI; Beck & Steer, 1990), Enns, Cox, Parker and Guertin (1998) found a two-factor model to better represent their data than a one-factor model. They did not, however, consider a three-factor model. In sum, when the tripartite model structure was directly tested against other factor structures, it was most often found superior to other models.

When including exploratory factor analyses performed on individual symptom measures, there have been significant inconsistencies with regard to the number and kind of symptom dimensions found to best describe depression alone (for reviews, see Beck, Steer & Garbin, 1988; Clark & Watson, 1991; Mandell, 1987). In her review of factor-analytic studies involving the HRSD, Mandell (1987) concluded that no consistent factor pattern can be identified among the different studies. In studies published since this

9

review, most frequently the four-factor solution was found superior to other factor solutions (e.g., Dozois, 2003; O'Brien & Glaudin, 1988; Onega & Abraham, 1997; Pancheri, Picardi, Pasquini, Gaetano, & Biondi, 2002); however, best fitting models were reported to have as few as one and as many as six factors (e.g., Amin, Daradkeh, Hamdi, & Abou-Saleh, 1999; Fleck, Poirier-Littre, Guelfi, Bourdel, et. al., 1995; Maier, Phillipp, Gerken, 1986; Marcos & Salamero, 1990). Despite this great variation in reported factor structures for the HRSD, however, almost all reports identified one factor representing clinical ratings of *pure depression symptoms* (e.g., guilt, lack of interest/activity, retardation, and depressed mood) and (at least) one different factor representing *anxiety and somatic complaints*. Also frequently reported were two factors representing *insomnia* and *anorexia,* respectively.

Reports on the factor structure of the BDI and its upgraded version, the BDI-II (Beck, Steer, & Brown, 1996), which more adequately reflects the DSM –IV criteria for Major Depressive Disorder (APA, 1994), are more consistent than those regarding the HRSD (Mandell, 1987). Most findings included two factors that can be described as self-reported *negative cognition* and *affective/motivational problems,* which bear a strong resemblance to the tripartite model dimensions of GD and ANH, respectively. However, some studies found that these two factors alone best describe the structure of the BDI (e.g., Beck, Steer, & Brown, 1996; Steer, Ball, Ranieri, & Beck, 1999), whereas others identified a third factor reflecting *somatic complaints* (e.g., Beck & Beamesderfer, 1974; Burne & Baron, 1993; Clark, Cavanaugh, & Gibbons, 1983; Steer, Beck, Riskind, & Brown, 1987; Tanaka & Hubs, 1984).

Variation in results are likely, at least in part, attributable to measurement characteristics (e.g., selection of items, response format), sample characteristics (e.g.,

base rate of symptoms), and/or the choice and implementation of statistical procedures (Beck, Steer & Garbin, 1988). The number of extracted factors varies with statistical procedures as well as the criterion for factor extraction used by the investigator. In sum, exploratory factor-analytic studies on some individual depression measures revealed factors which in some ways resemble the tripartite model dimensions of GD and ANH; yet, findings are inconsistent.

Further support for the tripartite model stems from psychophysiological, neurobiological and pharmacological studies which suggest that distinct (but interactive) biological systems underlie the different symptom dimensions. The basic distinction that has consistently emerged is between an aversive and an appetitive motivation system (e.g., Carver & White, 1994; Clark, Watson & Mineka, 1994; Fowles, 1988, 1994; Gray, 1982; Lang, Bradley & Cuthbert, 1998; Watson et al., 1999). NA has been linked to the aversive system which is normally activated when threat is anticipated. Behaviorally, this leads to a defensive reaction such as inhibition or passive avoidance of some activity (e.g., Gray, 1982; Lang et al., 1998; Lang, Davis & Öhman, 2000). SA may also be produced by an aversive motivation system (Lang et al., 1998, 2000; Shelton & Tomarken, 2001), but – different from NA – has been linked to a bodily fear response to perceived acute threat, which may serve the biological function of preparing the body for immediate action (e.g., Gray 1982; Barlow, 1988). PA and anhedonia have been linked to an appetitive system responsible for interest, curiosity and the approach of rewarding stimuli (Dichter, 2001). For a more comprehensive review of this literature, the reader is referred to Mineka, Watson, and Clark (1998).

Application of the Tripartite Model to Measurement

One of the most crucial functions of depression assessment is to assign and evaluate treatment strategies. In order to optimize treatment of this highly complex and heterogeneous disorder, it is essential to adequately assess *all* features of depression which may inform treatment.

While many traditional self-report and clinician-rated depression measures show high convergent validity (i.e. assess a common depression syndrome), poor discriminate validity between anxiety and depression measures has been reported consistently and across healthy and patient populations (Watson et al., 1995b). In a review of studies using a variety of depression and anxiety symptom measures, Clark and Watson (1991) found good convergent validity among depression self-report ratings with correlation coefficients in the low .70's. However, average discriminant correlation coefficients (within and across instruments) were almost as high, ranging from .62 to .70. It is interesting to note that clinician ratings, while assessing a consistent construct of depression with convergent correlation coefficients in the low .80's, show much smaller discriminant correlations with coefficients ranging from .40 to .45. Although this implies much better differentiation between depression and anxiety than found in self-report measures, it still represents significant correlations between anxiety and depression measures.

Clark and Watson (1991) attribute these high correlations between depression and anxiety measures to an overrepresentation of shared symptoms (relative to syndrome-specific symptoms) on both anxiety and depression scales. Also, item overlap between scales often artificially inflates correlations between the measures. For instance, one of the most widely used clinician-rating scales for the severity of depression, the HRSD,

12

contains six items (depressed mood, early insomnia, middle insomnia, agitation, feelings

of anxiety, and somatic anxiety) which are virtually identical to items on the HRSA. In

general, it appears that despite the fact that anhedonia is a core feature of depression, as

defined by the DSM-IV, it is underrepresented compared to non-specific symptoms at

least in some depression measures (e.g., Dichter, 2001; Feldman, 1993).

The first measure to separately assess the constructs, GD, ANH and SA, is the Mood

and Anxiety Symptom Questionnaire (MASQ; Watson et al., 1995a, b). The MASQ was

created in the attempt to improve discriminant validity between depression and anxiety

and is based conceptually on the tripartite model. It is a 90-item self-report measure on

which subjects rate the extent to which they experienced a list of symptoms associated

with depression and anxiety during the previous week. The measure contains six scales,

three of which are aimed at assessing various facets of GD (GD - Mixed Symptoms, GD -

Depressive Symptoms, and GD - Anxious Symptoms). Two scales, Loss of

Interest/Anhedonia and High Positive Affect assess a dimension ranging from low

positive affect (i.e. anhedonia) to high positive affect, respectively; and finally, the scale

Anxious Arousal is used to assess the construct SA. Although some refinements of the

MASQ may be necessary, the MASQ is superior to traditional depression measures in its

comprehensive assessment of ANH and separate assessment of different symptom

components of depression and anxiety.

Relating the Tripartite Symptom Dimensions to Anxiety and Depression

A core prediction of the tripartite model is that symptoms of the *specific* clusters,

ANH and SA, can better differentiate between anxiety and depression disorders than

symptoms of the *non-specific* cluster GD. In their analyses of five samples (three college

student, one healthy adult, one substance abuse patient, total N = 1883), Watson and colleagues found support for this prediction (Watson et al., 1995b). The authors created two sets of scales assessing anxiety- and depression-related symptoms experienced over a one-week period. One anxiety and one depression scale were based on relatively specific symptoms; the other scales (one for anxiety and one for depression) were based on non-specific symptoms. Across all five samples, the correlations between the two scales consisting of specific symptoms, SA and ANH/PA, were much lower (ranging from .25 to .49) than those between the scales using the non-specific symptoms (ranging from .61 to .78). As the authors point out, on average, the SA and ANH/PA scales shared only 12% of their variance as compared to the 48% variance shared between the non-specific anxiety and depression scales. These results provide strong support for the prediction that scales emphasizing SA and ANH/PA better discriminate anxiety from depression than those emphasizing GD. It is especially noteworthy that the SA and ANH/PA scales improved discriminant validity while retaining good convergent validity (as indicated by at least moderate correlations with other standard measures of anxiety and depression, respectively) (Watson et al., 1995b). This suggests that the SA and ANH/PA scales also validly assess the constructs of anxiety and depression.

In a related study, Brown and colleagues (1998) tested the structure of the tripartite model in relation to anxiety and depression disorders (N = 350 outpatients) diagnosed according to the Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-IV, APA, 1994). They assessed trait NA and PA with the trait version of the PANAS. In their hierarchical structural model, they found that trait NA was significantly associated with depression (.67) and with all included anxiety disorders, namely generalized anxiety disorder (GAD) (.74), panic/agoraphobia (.65), obsessive compulsive

disorder (OCD) (.43), and social phobia (.31). Trait PA, on the other hand, was significantly (inversely) related only to depression (-.29) and social anxiety (-.28). The inverse relation between PA and social phobia, though inconsistent with predictions of the tripartite model, provides further support the notion that PA is associated with social engagement, which was suggested, for example, by Clark, Watson and Mineka (1994). SA symptoms were very strongly associated with panic/agoraphobia (.67), but none of the other disorders.

Although these findings largely support the relation of the tripartite dimensions to the diagnostic categories of depression and anxiety, some findings diverge from the predictions of this model. The extensive variation among anxiety disorders regarding their associations with NA and SA may be particularly relevant in this context. SA, for example, proposed by the tripartite model to be specific to anxiety in general, was very strongly associated with panic/agoraphobia, but was not significantly associated with any other anxiety disorder included in the study. In fact (after controlling for the variance explained by NA), SA was slightly negatively associated with GAD (-.22).

Despite the above cited evidence that SA is relative specific to (at least some forms of) anxiety, given the high prevalence of comorbid anxiety disorders in depressed populations (e.g. Alloy, Kelly, Mineka & Clemens, 1990; Clark, 1989; Kessler, Nelson, McGonagle, Liu, Swartz & Blazer, 1996), there is reason to expect up to moderate levels of SA symptoms in moderately to severely depressed patients (Joiner, 1996) and therefore this component will be considered in the present study as well.

In sum, several studies have found support for the notion that GD symptoms are associated with both anxiety and depression, that ANH symptoms are more specific to depression, and that SA symptoms are more specific to (at least some types of) anxiety.

Refinements of the tripartite model appear necessary to account for the diversity of anxiety disorders and their different relations to depression (e.g., Brown et al., 1998; Chorpita, 2002; Mineka, Watson and Clark, 1998). Also, variation among subtypes of depression with regard to their relation to the tripartite model symptom clusters remains unknown.

Application of the Tripartite Model to Treatment

To the knowledge of the author, no published study has compared the efficacy of pharmacotherapy to CBT with regard to the symptom dimensions of the tripartite model. Yet, a variety of indirect sources of evidence is available for both treatment modalities, which helped inform hypotheses regarding differential treatment effects on separate symptom dimensions proposed in this study. The following briefly describes some selected examples.

Pharmacotherapy (PT). The effectiveness of SSRIs in the treatment of depression is well established, although results are somewhat less consistent for more severe depression (for reviews, see Hirschfeld, 1999; Thase, 2000; Vaswani, Linda & Ramesh, 2003). Paroxetine, the primary medication used in this study, is the most potent of all currently available SSRIs (Bourin, Chue, Guillon, 2001). In addition to inhibiting serotonin reuptake, it also inhibits norepinephrine reuptake to some extent (and more than other SSRIs). This drug, however, has little affinity for dopaminergic receptors (Bourin et al., 2001). There is evidence that paroxetine is superior to placebo and comparable to other currently standard medications in the treatment of clinically depressed outpatients such as tricyclics and other SSRIs (e.g., Dunbar, Cohn, Fabre, Feighner et al., 1991; Feighner, J. P. & Boyer, W. F., 1989).

16

Despite the established efficacy of PT in the treatment of depression, individuals can differ immensely in their response to specific medications (Gitlin, 2002). Very little has been published relating the tripartite model symptom dimensions to the treatment of depression. One of the first publications linking antidepressants to the tripartite model symptom dimensions was written by Shelton and Tomarken (2001). The authors proposed a therapeutic heuristic, which favors the use of serotonergic antidepressants in the treatment of general distress and high NA, and the use of catecholaminergic agents in the treatment of anhedonia and low PA. The heuristic is based on findings regarding the pharmacological properties and treatment effects of these different classes of antidepressants (for a review, see Shelton & Tomarken, 2001).

Although very few studies have investigated the dimensions of the tripartite model in depression treatment directly, there is empirical support for the notion that SSRIs specifically reduce symptoms consistent with GD and SA. For example, Knutson and colleagues (Knutson, Wolkowitz, Cole, Chan, Moore, Johnson et al., 1998) assessed the effects of paroxetine versus placebo on NA and PA in 51 healthy individuals. The authors did not specify the outcome measure, but it is likely that the PANAS was used. After four weeks, treatment with paroxetine (relative to placebo) was related to a decrease in NA, but no change in PA. Research also suggests that SSRIs are effective in the treatment of anxiety disorders including panic disorder, social phobia, GAD, OCD, and post traumatic stress disorder (PTSD) (for a review see Feighner, 1999, and Vaswani et al., 2002). In an open-label study involving eight weeks of treatment with the SSRI sertraline, Boyer and colleagues (Boyer, Tassin, Falissart & Troy, 2000) used selected items from the Inventory for Depressive Symptomatology (Rush, Gullion, Brasco, Jarrett & Trivedi, 1996) and the Symptom Checklist-90 (Derogatis, Lipman, Covi, 1973) to

17

assess the different symptom clusters. The authors found that, in a sample of 140 depressed outpatients, symptoms of general distress and anxiety changed significantly faster (during the first week of treatment) than more depression-specific symptoms such as fatigue and anhedonia. Paroxetine has also been found to be associated with relatively rapid reduction of anxiety and agitation symptoms consistent with GD and SA in some depression treatment studies (e.g., Ravindran, Judge, Hunter, & Bray, 1997; Sheehan, Dunbar & Fuell, 1992). However, SSRIs are expected to vary in their effects on symptoms of SA such as physiological arousal (Gitlin, 2002).

In comparison, in a recent randomized clinical trial, Tomarken and colleagues (Tomarken, Dichter, Freid, Addington & Shelton, 2004) tested bupropion SR versus placebo in the treatment of 19 depressed outpatients. Using the 60-item version of the MASQ (Watson et al., 1995a) as outcome measure, symptoms were tracked over the course of twelve weeks. Although all assessed symptom dimensions significantly improved over the course of treatment, bupropion was superior to placebo only with regard to reducing symptoms of ANH and some types of GD. Bupropion was not significantly better than placebo in reducing SA or GD symptoms more typical of anxiety.

Bodkin and colleagues (Bodkin, Lasser, Wines, Gardner & Baldessarini, 1997) were the first to directly report the differential effects of SSRIs and bupropion on symptoms of generalized and specific anxiety versus anhedonia. In their study of 27 cases, symptoms were assessed by non-standardized clinician ratings. They found SSRIs effectively reduced anxiety, panic and obsessive/compulsive/ruminative symptoms (consistent with GD and SA), but did not improve (and, in fact, dampened) energy and motivation

(consistent with ANH). In contrast, bupropion significantly improved energy and motivation but did not decrease symptoms of anxiety.

On the other hand, catecholaminergic agents such as bupropion and venlafaxine have also been found to effectively treat anxiety symptoms and, conversely, SSRIs have also been found to reduce symptoms consistent with anhedonia. A few direct comparisons of catecholaminergic versus serotonergic agents yielded no significant differential treatment effects for either GD (e.g., Dichter, Tomarken, Freid, Addington & Shelton, 2005; Trivedi, Rush, Bolden-Watson, Houser & Metz, 2001) or ANH (e.g., Dichter et al., 2005). Authors concluded that the two medications, though acting via different mechanisms, may both be equally effective in the treatment of both, GD and ANH.

In sum, it is difficult to infer the involvement of specific neurotransmitter systems using evidence from studies investigating medication effects on specific symptoms. Neurotransmitter systems are interlinked and affect each other; even highly selective drugs can have indirect effects on various different systems (Shelton & Tomarken, 2001). Without ruling out the possible involvement of other neurotransmitter systems, Shelton and Tomarken (2001) nevertheless propose that serotonergic agents (e.g., SSRIs) may more directly modulate symptoms of general distress and somatic anxiety, while antidepressants that more strongly target catecholamines (e.g., bupropion) may more effectively reduce anhedonia and improve appetitive motivation. Although neurobiological and behavioral studies involving both animal and human populations generally support this view (see Shelton & Tomarken, 2001), more research, particularly clinical trials, is needed to replicate previous findings and to uncover the specifics of the neurobiological mechanisms involved. The present study seeks (in part) to replicate the initial findings of Knutson et al. (1998) and Boyer at al. (2000). Unlike those studies,

however, the present study will (a) use the tripartite model as a theoretical basis and conceptual guide for forming symptom clusters and (b) compare the effect of different treatment modalities (PT, CBT and placebo) on these distinct symptom clusters.

Cognitive behavior therapy (CBT). Cognitive behavior therapy (CBT) for depression and anxiety includes a variety of strategies such as modification of maladaptive beliefs in order to improve affect, behavioral activation, exposure to distressing situations and others (e.g., Beck, 1995; Beck, Emery & Greenberg, 1985; Beck., Rush, Shaw & Emery, 1979). While CBT has consistently been found at least as effective as other psycho- or pharmacotherapies in the acute treatment of mild to moderate depression (Blackburn & Moore, 1997; Dobson, 1989; Gloaguen, Cottraux, Cucherat & Blackburn, 1998; Hautzinger, de Jong-Meyer, Treiber & Rudolf, 1996; Hollon, Shelton & Loosen, 1991; Robinson, Berman & Neimeyer, 1990), the efficacy of CBT in the treatment of severe depression is less well established. The APA guidelines recommend that CBT should not be used without PT for treating severe depression. Yet, as noted by DeRubeis, Gelfand, Tang and Simons (1999) as well as Hollon, Haman and Brown (2002), this recommendation is not entirely consistent with research findings regarding the treatment of severe depression. In a mega-analysis (i.e. meta-analysis of original data) conducted by DeRubeis and colleagues (1999) using data from four randomized clinical trials (169 patients total), CBT performed as well as tricyclic antidepressants in the treatment of severely depressed outpatients. More recent studies have further supported findings that CBT is equally effective as PT in the acute treatment of severely depressed outpatients (for review, see Hollon & Beck, 2002; for a discussion of this research, see DeRubeis et al., 1999; Hollon & Shelton, 2001; Klein, 2000).

Although CBT is an effective treatment for depression, and depression includes symptoms of GD and ANH one cannot infer, however, that CBT works equally well for both of these symptom clusters. Instead, it is entirely possible that CBT addresses one of the symptom clusters more effectively (or faster) than another. Although CBT has been found to be effective in treating both depression and anxiety disorders (e.g. Chambless & Gillis, 1996), and many basic intervention strategies such as the cognitive restructuring can be applied to both depression and anxiety, some strategies may target some symptom dimensions more effectively than others. It could be speculated, for instance, that behavioral activation targets symptoms such as inertia and lack of motivation consistent with the cluster ANH. This would be consistent with the idea that behavioral activation increases level of activity and positive engagement with the environment, and with the fact that this strategy is used successfully in the treatment of depression (Jacobson, Martell & Dimidjian, 2001; Martell, Addis & Jacobson, 2001), but not in the treatment of anxiety.

In summary, depression is a multidimensional illness which can be characterized by different symptom clusters. The tripartite model represents one way to conceptualize symptom clusters, which may have important implications for the treatment of depression. The investigation of differential treatment effects on symptom dimensions consistent with the tripartite model may ultimately prove useful in the process of assigning the best treatment strategies to each depressed individual.

CHAPTER II

THE PRESENT STUDY

The primary aims of the present study were to use the tripartite model as a theoretical framework in order to (1) investigate change in the constructs GD, ANH and SA in a moderately to severely depressed sample over the course of treatment, (2) investigate between-treatment (PT versus CBT) effects on the growth trajectories of GD, ANH, and SA, and (3) investigate effects of pre-treatment comorbid anxiety diagnoses on intake levels and change trajectories of GD, ANH, and SA. Rather than assessing each construct by only one measure (i.e., manifest indicator), multiple indicators were used to model GD, ANH, and SA as latent constructs. Manifest indicators were parcels of selected items drawn from standard depression and anxiety symptom measures. Sub-goals for this aim therefore included to (a) form item parcels consistent with the three clusters of the tripartite model from the existing measures, and (b) test a three-factor structure consistent with the tripartite model in the current data via confirmatory factor analysis. The current study addressed the following hypotheses (H):

Three – factor structure. Based on previous empirical support for the tripartite model, it was hypothesized that a three factor-structure consistent with the tripartite model dimensions would provide at least adequate fit for data derived from a depressed outpatient sample (H 1).

Treatment differences in change curves of ANH, GD, and SA. The main analyses were aimed at modeling change in ANH, GD, and SA over the course of treatment and at investigating treatment differences in growth trajectories. Both treatments, PT and CBT,

were expected to lead to improvement in all three dimensions of the tripartite model

(H 2). Based on previous findings suggesting that serotonergic agents are particularly

effective in treating symptoms consistent with general distress and anxiety as compared

to symptoms consistent with anhedonia and low PA (Bodkin et al., 1997; Knutson et al.,

1998; Shelton and Tomarken, 2001), together with the absence of equivalent findings for

CBT, PT was expected to be superior to CBT in reducing symptoms consistent with GD

(H 3). With regard to ANH, there were two alternative lines of reasoning: The

comparatively lower benefit of serotonergic agents in the treatment of symptoms

consistent with ANH together with the speculation that behavioral activation, a technique

emphasized in the early stages of CBT in this study, specifically targets symptoms of

anhedonia by increasing pleasure and mastery experiences, it was hypothesized that ANH

would increase as (or more) rapidly in the CBT condition as in the PT condition (H 4a).

On the other hand, the constructs of state NA and PA have been found to be linked and at

least moderately correlated (e.g., Feldman Barrett & Russell, 1998; Tellegen, Watson &

Clark, 1999), which may lead to the hypothesis that GD and ANH would improve

simultaneously and thus ANH will show equivalent patterns of change to GD, i.e.

improve more rapidly with PT than with CBT (H 4b). SA was expected to be very

closely related to GD (Brown, Chorpita & Barlow, 1998) and improvement in SA was

therefore expected to closely follow the pattern of GD, i.e. show more rapid improvement

with PT than with CBT (H 5).

   The effect of comorbid anxiety disorders at intake on the change curves of ANH,

GD, and SA over the course of treatment. Based on findings by Watson, Clark and

Carey (1988) and by Brown and colleagues (1998) that ANH is relatively specific to

depression (as compared to anxiety), pre-treatment ANH was not expected to differ

23

between participants with pre-treatment comorbid anxiety disorder versus those without (H 6). The above mentioned studies found GD to be shared by depression and anxiety. Although these studies did not conclude that GD would be additive for comorbid conditions both individually associated with GD, it was nevertheless hypothesized that pre-treatment GD would be elevated in individuals with any pre-treatment comorbid anxiety diagnoses (H 7). Based on evidence for a close relation between panic disorder and SA (Brown et al., 1998), it was predicted that pre-treatment SA would be significantly higher in participants with comorbid panic disorder, yet would not be associated with any other comorbid anxiety disorder (H 8). Further, GD was hypothesized to be present in other forms of psychopathology as well (Shelton & Tomarken, 2001) and thus the presence of any pre-treatment comorbid Axis I condition was expected to be associated with higher levels of pre-treatment GD, but not ANH or SA (H 9). Finally, exploratory analyses were performed using comorbid anxiety diagnoses at intake as predictors of change in ANH, GD, and SA over the course of treatment.

CHAPTER III

METHODS

This study is based on an existing data set from a two-site comparison of CBT versus PT in the treatment of depression and the prevention of subsequent relapse (DeRubeis et al., 2005; Hollon et al., 2005). Methodology and main findings of the CPT II project have been presented elsewhere (DeRubeis et al., 2005; Hollon et al., 2005). The CPT II project included three treatment conditions: PT, CBT, and pill placebo. Unlike the two active treatment conditions, PT and CBT, each 16 weeks in duration, the placebo condition was only eight weeks in duration and was therefore not included in the current analyses. The following describes the methods of this project as they pertain to the current study.

Sample

Participants for CPT II were recruited at the *Adult Psychiatry Clinic at Vanderbilt University Medical Center* and at the *Depression Research Unit at the University of Pennsylvania*. The current sample consisted of 181 depressed outpatients, 92 from Vanderbilt and 89 from the University of Pennsylvania. Participants were primarily Caucasian (82.9%) and had an average of 14.6 (SD = 2.4) years of education. The reader is referred to DeRubeis et al. (2005) for between-site comparisons of patient characteristics and treatment effects. There were 119 participants in the PT condition (mean age = 39.81, SD = 11.65; 70 females) and 62 in the CBT condition (mean age = 40.18, SD = 11.36, 35 females). All participants met criteria for Major Depressive

Disorder according to the DSM-IV and received a score of 20 points or higher on the 17-item version of the HRSD for the two weeks preceding treatment (in two separate evaluations). The average HRSD score for the 17-item version at intake was 23.62 (SD = 2.80) and did not differ significantly between groups.

Individuals were excluded if they met any of the following criteria: lifetime history of psychotic disorders or bipolar disorder; history of substance dependence in the past year; medical conditions which would interfere with study medications; other Axis I disorders if they were more in need of treatment than depression (five patients diagnosed with anxiety disorder were excluded for this reason); risk for suicide; current treatment with certain psychoactive medications; or failure to respond to either paroxetine or CBT within the preceding year (individuals who failed to respond to other kinds of treatments were not excluded). Minimal exclusion criteria together with the requirement of high levels of depression severity produced a sample of outpatients with relatively severe depression and high rates of comorbid disorders.

Design and Procedure

Participants were recruited from the community and from clinical referrals. Interested individuals participated in a pre-screening interview which included a brief diagnostic assessment and the HRSD. After informed consent was obtained, an extensive intake evaluation was performed. It included the Structured Clinical Interview for DSM-IV Axis I Disorders-Patient Version (SCID-I/P; First, Spitzer, Gibbon & Williams, 1994) as primary assessment tool for Axis I disorders. In context of the CPT II project, interrater reliability for the assessment of criteria for a Major Depressive Episode produced a kappa coefficient of .80 (n=12; cited in DeRubeis et al., 2005). In addition,

intake diagnoses were independently assessed by experienced psychiatrists. A physical

exam and a standard medical battery were used to rule out medical conditions which

could interfere with the study medication. One week after the original evaluation, a re-

screen assured continued endorsement of full criteria for major depressive disorder and a

score of 20 or higher on the HRSD. All patient assessment procedures were performed

by evaluators, who met weekly for training and supervision. Interrater agreement for the

17-item version of the HRSD was found to be exceptional with an Intraclass Correlation

Coefficient (ICC) of .96 (N=24; cited in DeRubeis et al., 2005).

Participants who met study criteria were randomized to the treatment conditions. The

following blocking variables were used (in order): sex, marital status, melancholic

subtype and number of prior episodes of depression. Within seven days of

randomization, participants started treatment. Although some measures were assessed

more frequently, all of the measured considered for the present study were administered

at the initial intake evaluation, at weeks 8 and 16. Treatment providers and evaluators

were blind to medication conditions.

Treatment Conditions

Cognitive Behavior Therapy (CBT). Sessions were performed according to the

treatment manuals by Beck and colleagues (e.g., Beck, 1995; Beck et al., 1979).

Generally, CBT aims at the identification and evaluation of maladaptive beliefs and

reasoning in order to derive at more adaptive and realistic thought processes (cognitive

restructuring). According to the theoretical background of this approach, the content of

thoughts and beliefs is linked to specific states of affect. Therapy is therefore based on

the assumption that changes in thinking can achieve changes in feeling. Sessions were

highly structured, yet treatment placed emphasis on fostering growing independence in participants. Further, therapy initially focused heavily on behavioral activation, and later on practicing strategies to cope with distressing life events and other triggers of depression in the future. Cognitive restructuring was emphasized throughout treatment. However, therapists were free to apply certain other strategies such as exposure or relaxation training when appropriate. Generally, 50-minute sessions were scheduled twice per week for the first four weeks, once or twice per week for the next four weeks, and weekly during the remaining eight weeks.

   Pharmacotherapy (PT). The main study medication was paroxetine, which was started at 10-20 mg daily and increased in 10-20 mg increments over subsequent weeks up to a maximum of 50 mg daily by the end of week 6 (or until the patient remitted). Generally, patients who did not meet criteria for partial remission by week 8 were augmented with lithium or desipramine; however, on occasion other medications were used in order to maximize clinical response to PT. As described in DeRubeis et al. (2005), average doses of paroxetine were 14 ± 4.9 mg/day during the first week of treatment, 31.6 ± 11.2 mg/day during the fourth week, 38.8 ± 11.0 by week 8, and 37.3 ± 12.4 mg/day during weeks 9 through 16. Clinical management sessions were held weekly during the first four weeks of treatment and after that were held at least biweekly. Clinical management sessions (lasting approximately 20 minutes) were conducted for medication management, which allowed general supportive procedures. Experienced pharmacotherapists supervised the implementation of PT.

<center>**Measures**</center>

In order to assess the latent constructs ANH, GD, and SA, items were drawn from the following measures:

The Hamilton Rating Scale for Depression (HRSD; Hamilton, 1960). The HRSD is a semi-structured interview, in which a trained evaluator assesses depression severity during the previous week (see Appendix A). Trained evaluators rated 24 items on (3- and 5-point) Likert scales ranging from symptoms being absent to severe. In this study, the HRSD was modified to include atypical symptoms (Thase, Frank, Mallinger, Hamer & Kupfer, 1992) and administered according to the interview guide by Williams (1988). All 24 items were considered for constructing item parcels. Interrater reliability has been found to greatly improve with training of the interviewers (Clark & Watson, 1991). In the original publication, Hamilton (1960) reported an interrater reliability of .90 for the 17-item version.

The Hamilton Rating Scale for Anxiety (HRSA; Hamilton, 1959). The HRSA is a 14-item semi-structured interview similar to the HRSD. The HRSA assesses the severity of symptoms of anxiety during the past week (see Appendix B). Evaluators rate the severity of anxiety symptoms on a 5-point scale ranging from *none* (0) to *very severe* (4). Not much information is available on the psychometric properties of the HRSA. Available sources have reported good interrater reliability for this measure (e.g., Gjerris et al., 1983); the original article by Hamilton (1959) reported an interrater reliability of .89.

The Beck Depression Inventory – II (BDI-II; Beck & Steer, 1987). The BDI-II is a 21-item questionnaire, in which participants rate the severity of their depression symptoms averaged over the previous week (see Appendix C). Specifically, the

<center>29</center>

participant chooses one of four phrases representing different levels of severity of a particular symptom. Original psychometric tests of the BDI-II by Beck, Steer, and Brown (1996) revealed excellent internal consistency in both outpatients (Cronbach coefficient alpha = .92) and college students (coefficient alpha = .93). The original BDI, which shares most items with the BDI-II has also been shown to have high internal consistency with estimates ranging from .76 and .95 in clinical populations (Beck, Steer & Garbin, 1988).

The Beck Anxiety Inventory (BAI; Beck & Steer, 1990). The BAI is a 21-item self-report inventory, which assesses severity of anxiety symptoms during the previous week (see Appendix D). Items are rated on a four-point scale ranging from "it did not bother me at all" (0) to "I could barely stand it" (3). This measure was specifically designed to reduce overlap with depressive symptoms. The BAI has been shown to possess excellent internal consistency in outpatients with coefficient alpha ranging from .92 to .94 (Beck, Epstein, Brown & Steer, 1988; Fydrich, Dowdall, & Chambless, 1990).

The Positive and Negative Affect Scale (PANAS; Watson, Clark & Tellegen, 1988). The PANAS is a 20-item self-report scale designed to assess affect over the past week. This measure is based directly on the two-factor affect model and contains two scales, PA and NA. These scales assess high PA and high NA. Each scale consists of ten affect adjectives (e.g., distressed, excited). Participants rate on a scale ranging from one (very slightly or not at all) to five (extremely) the degree to which the items describe their mood over the past week. The PANAS scales have been extensively investigated for their psychometric properties (see Watson & Vaidya, 2003). They have been shown to have very good internal consistency with coefficient alphas ranging from .83 - .90 for the NA scale and from .84 - .91 for the PA scale (Watson & Clark, 1994 as referenced in

Watson & Vaidya, 2003). In this study, the PANAS items were administered as part of a 49-item scale containing a wide range of affect adjectives (see Appendix E for a copy of the 49-item measure; PANAS items are bold).

Item Selection and Formation of Item Parcels

In order to assess the latent constructs, GD, ANH and SA, items were selected from the HRSD, HRSA, BDI, BAI, and PANAS. Later, item parcels were formed and served as observed indicators. Item parcels were created based on similarity and source of the items in order to reduce the number of indicator variables as well as increase reliability of indicators and normality of their distributions (e.g., Bandalos & Finney, 2001; Little, Cunningham, Shahar, & Widaman, 2002; Little, Lindenberger, & Nesselroade, 1999). The selection of items and the formation of item parcels were guided by the theory of the tripartite model (Clark & Watson, 1991) and the factor analytic work on the MASQ by Watson and colleagues (Watson et al., 1995a,b). Five volunteers with background in clinical psychology and extensive experience with all involved measures (the author, another advanced clinical psychology PhD student, and three doctoral-level clinical psychologists) were recruited for a formal task involving the assignment of items to categories. The experts independently assigned all items from the HRSD, HRSA, BDI, and BAI to one (or none) of the six categories reflecting the MASQ subscales – General Distress (Mixed symptoms), General Distress (Anxious symptoms), General Distress (Depressive symptoms), Somatic Anxiety, Loss of Interest, and High Positive Affect – based on resemblance of the item to items in the MASQ scales (see Appendix F). After the task was completed, the three GD categories were merged and the categories Loss of Interest and High Positive Affect formed the category Anhedonia, leaving three

31

categories: ANH, GD, and SA. Included in further analyses were items assigned to the same category by the author *and* at least three of the four remaining participants. With regard to GD, items were included if four of five participants assigned the item to any of the GD categories. Of the 85 total items, 56 items (66%) were selected based on these criteria. The main reasons for the exclusion of items were poor fit with all categories and good fit with more than one category. Four additional items were included in the study after group consensus was achieved.

The formed parcels were also compared to results of exploratory factor analyses on week 16 data (week 16 was chosen because it offered maximal variability in the data as compared to earlier time points). Principal Axis factor analysis followed by the oblique promax rotation was performed on the items of each measure separately and factors with eigenvalues greater or equal to 1.0 were extracted. Factor-analytic results were largely consistent with the conceptual formation of parcels, i.e. items grouped into the same parcels tended to load highest on the same factors. Items were excluded from analyses if they (a) loaded highest on a different factor than the other items in that parcel or (b) showed poor differentiation between factors. A total of six items was excluded for this reason.

Of the 54 selected items, those derived from the same original measure and placed in the same category were grouped together to form ten item parcels (see Table 1). One parcel, which consisted of GD items from the HRSD, was divided into two parcels, HRSD_GDD (containing more depression related GD items) and HRSD_GD (containing more anxiety related and mixed GD items). Two additional parcels were created based on the PA and NA subscales of the PANAS.

Table 1

Item Assignment to Parcels

Parcel	Items	MASQ Category
Hamilton Rating Scale for Depression		
HRSD_ANH	7. Work and activities, 8. Psychomotor retardation 13. Energy, 14. Libido	Anhedonia
HRSD_GDD	1. Depressed mood, 2. Guilt, 3. Suicide 23. Hopelessness, 24. Worthlessness	General Distress
HRSD_GD	9. Agitation, 10. Feeling anxious 15. Hypochondriasis, 22. Helplessness	General Distress
HRSD_SA	11. Somatic anxiety	Somatic Anxiety
Beck Depression Inventory		
BDI_ANH	4. Loss of pleasure, 12. Loss of interest 15. Loss of energy, 20. Tiredness/ fatigue 21. Loss of interest in sex	Anhedonia
BDI_GD	1. Sadness, 2. Pessimism, 3. Past failure 5. Guilty feelings, 6. Punishment feelings 7. Self dislike, 8. Self criticalness 10. Crying, 14. Worthlessness	General Distress
Hamilton Rating Scale for Anxiety		
HRSA_GD	1. Anxious mood, 2. Tension, 3. Fears	General Distress
HRSA_SA	7. Muscular, 8. Sensory, 9. Cardiovascular 10. Respiratory, 13. Autonomic	Somatic Anxiety
Beck Anxiety Inventory		
BAI_GD	4. Unable to relax, 5. Fear of the worst happening 9. Terrified, 10. Nervous, 17. Scared	General Distress
BAI_SA	1. Numbness or tingling, 2. Feeling hot 3. Wobbliness in legs, 6. Dizzy or lightheaded 7. Heart pounding or racing, 8. Unsteady 11. Feelings of choking, 12. Hands trembling 13. Shaky, 15. Difficulty breathing, 19. Faint 20. Face flushed, 21. Sweating	Somatic Anxiety
Positive and Negative Affect Scale		
PA	1. proud, 2. interested, 3. excited, 4. strong 5. active, 6. attentive, 7. enthusiastic 8. determined, 9. inspired, 10. alert	Anhedonia
NA	1. hostile, 2. distressed, 3. irritable, 4. ashamed 5. upset, 6. scared, 7. afraid, 8. jittery 9. nervous, 10. guilty	General Distress

CHAPTER IV

RESULTS

Table 2 shows the descriptive statistics for the raw data of all twelve parcels separately for both treatment groups and for three time points (intake, week 8, and week 16). Individual items missing from a parcel were substituted with the mean. The number of missing observations (i.e. whole parcels), can be inferred from the column N in Table 2, which indicates the number of observations by parcel, time point, and treatment condition. As each participant should have contributed one observation to each cell, the number of missing observations equals the number of observations for a given parcel at a given time point (N) subtracted from the total number of participants in each treatment condition (N = 119 for PT and N = 62 for CBT). Missing observations varied between parcels because in the CPT II project priority was given to collect data on HRSD and BDI. Missing data ranged from 0 to10 % at intake, from 9 to 18 % at week 8, and from 12 to18 % at week 16. In a longitudinal study such as the present one, this amount of data is expected to be missing for a variety of random (e.g., schedule conflict, move, etc.) and more systematic reasons (e.g., sickness, attrition, etc.).

Natural logarithmic transformation (y = ln (x + 5)) was performed on all parcels in order to normalize the distributions. This transformation reduced skewness (an indicator of the asymmetry of the distribution) and kurtosis (an indicator of the clustering of observations) values. After the transformation, skewness ranged from -0.74 to 1.49 in the CBT group and from -1.07 to 1.94 in the PT group, kurtosis ranged from -1.03 to 3.78 in CBT and from -0.91 to 3.54 in PT.

Table 2

Descriptive Statistics for the Item Parcels (Prior to Log-Transformation):
Pharmacotherapy Condition (N=119)

Parcel	N	M	SD	Possible range	Min	Max	Skewness	Kurtosis
Intake								
PA	116	1.56	0.51	1-5	1.00	3.30	1.32	1.65
NA	116	2.77	0.81	1-5	1.00	4.80	0.21	-0.54
HRSD_ANH	119	2.31	0.56	0-4	0.63	3.25	-0.48	-0.25
HRSD_GDD	119	1.85	0.51	0-4	0.50	3.10	-0.16	-0.14
HRSD_GD	119	1.05	0.35	0-4	0.25	2.13	0.44	0.23
HRSD_SA	119	1.84	0.65	0-4	0.00	3.00	-0.78	0.55
BDI_ANH	107	1.81	0.56	0-3	0.70	3.00	0.21	-0.61
BDI_GD	107	1.53	0.52	0-3	0.22	2.89	0.30	0.29
HRSA_GD	111	1.35	0.54	0-4	0.17	2.67	-0.13	-0.31
HRSA_SA	111	0.68	0.45	0-4	0.00	2.40	0.68	0.79
BAI_GD	114	1.24	0.68	0-3	0.00	3.00	0.21	-0.52
BAI_SA	114	0.48	0.45	0-3	0.00	1.77	1.20	0.79
Week 8								
PA	97	2.43	0.88	1-5	1.00	4.40	0.36	-0.49
NA	97	1.87	0.70	1-5	1.00	4.10	0.92	0.49
HRSD_ANH	108	1.36	0.89	0-4	0.00	3.25	0.29	-0.74
HRSD_GDD	108	0.79	0.70	0-4	0.00	3.00	1.14	0.84
HRSD_GD	108	0.52	0.41	0-4	0.00	1.75	0.59	-0.07
HRSD_SA	108	1.31	0.93	0-4	0.00	3.00	0.20	-0.81
BDI_ANH	102	0.88	0.70	0-3	0.00	3.00	1.21	1.56
BDI_GD	102	0.58	0.58	0-3	0.00	2.44	1.19	1.03
HRSA_GD	106	0.67	0.51	0-4	0.00	2.00	0.48	-0.40
HRSA_SA	106	0.41	0.38	0-4	0.00	1.80	1.42	2.07
BAI_GD	100	0.45	0.53	0-3	0.00	2.80	1.76	3.93
BAI_SA	101	0.25	0.29	0-3	0.00	1.46	1.50	3.02
Week 16								
PA	101	2.53	0.94	1-5	1.00	5.00	0.21	-0.74
NA	101	1.69	0.73	1-5	1.00	4.10	1.58	2.18
HRSD_ANH	105	0.95	0.86	0-4	0.00	3.50	0.74	-0.11
HRSD_GDD	105	0.60	0.66	0-4	0.00	2.60	1.38	1.10
HRSD_GD	105	0.41	0.39	0-4	0.00	1.75	1.15	1.20
HRSD_SA	105	1.17	0.87	0-4	0.00	3.00	0.28	-0.63
BDI_ANH	100	0.66	0.70	0-3	0.00	3.00	1.45	2.13
BDI_GD	100	0.37	0.47	0-3	0.00	2.22	1.73	3.04
HRSA_GD	101	0.56	0.58	0-4	0.00	3.00	1.43	2.67
HRSA_SA	101	0.40	0.39	0-4	0.00	1.40	0.96	0.18
BAI_GD	98	0.34	0.54	0-3	0.00	2.80	2.19	5.09
BAI_SA	98	0.25	0.26	0-3	0.00	1.08	1.27	1.23

Table 2, continued

Descriptive Statistics for the Item Parcels (Prior to Log-Transformation): Cognitive Behavior Therapy Condition (N = 62)

Parcel	N	M	SD	Possible range	Min	Max	Skewness	Kurtosis
Intake								
PA	61	1.73	0.61	1-5	1.00	3.40	1.14	0.74
NA	61	2.76	0.74	1-5	1.30	4.60	0.23	-0.28
HRSD_ANH	62	2.31	0.46	0-4	1.13	3.25	-0.17	-0.14
HRSD_GDD	62	1.81	0.49	0-4	0.90	2.90	0.00	-0.80
HRSD_GD	62	1.08	0.35	0-4	0.50	2.00	0.83	0.45
HRSD_SA	62	2.06	0.68	0-4	0.50	4.00	0.16	0.36
BDI_ANH	58	1.73	0.52	0-3	0.40	2.80	-0.09	-0.20
BDI_GD	58	1.43	0.44	0-3	0.50	2.56	0.23	-0.16
HRSA_GD	56	1.43	0.68	0-4	0.00	4.00	1.63	6.03
HRSA_SA	56	0.82	0.57	0-4	0.00	3.00	1.23	2.79
BAI_GD	60	1.27	0.70	0-3	0.00	3.00	0.41	0.14
BAI_SA	60	0.56	0.52	0-3	0.00	2.31	1.39	1.68
Week 8								
PA	53	2.32	0.78	1-5	1.00	3.90	0.26	-0.87
NA	53	2.31	0.84	1-5	1.00	4.40	0.57	-0.54
HRSD_ANH	53	1.48	0.69	0-4	0.00	2.75	-0.09	-0.55
HRSD_GDD	53	0.98	0.66	0-4	0.00	2.60	0.67	-0.34
HRSD_GD	53	0.64	0.38	0-4	0.00	1.75	0.40	0.23
HRSD_SA	53	1.57	0.80	0-4	0.00	3.00	-0.46	-0.21
BDI_ANH	54	1.01	0.64	0-3	0.00	2.80	0.68	0.58
BDI_GD	54	0.76	0.57	0-3	0.00	2.67	0.80	0.90
HRSA_GD	52	1.08	0.64	0-4	0.00	3.33	0.87	1.72
HRSA_SA	52	0.58	0.44	0-4	0.00	1.60	0.59	-0.50
BAI_GD	51	0.68	0.50	0-3	0.00	2.20	0.51	0.10
BAI_SA	52	0.27	0.36	0-3	0.00	1.46	1.68	2.38
Week 16								
PA	53	2.48	0.80	1-5	1.00	4.30	0.17	-0.46
NA	53	1.88	0.67	1-5	1.00	3.50	0.67	-0.19
HRSD_ANH	54	1.13	0.86	0-4	0.00	3.00	0.37	-0.83
HRSD_GDD	54	0.71	0.71	0-4	0.00	2.80	0.96	0.19
HRSD_GD	54	0.51	0.48	0-4	0.00	2.25	1.47	2.78
HRSD_SA	54	1.09	1.00	0-4	0.00	4.00	0.52	-0.24
BDI_ANH	51	0.75	0.72	0-3	0.00	3.00	1.00	0.68
BDI_GD	51	0.48	0.54	0-3	0.00	2.67	1.81	4.22
HRSA_GD	54	0.80	0.78	0-4	0.00	4.00	1.87	4.72
HRSA_SA	54	0.46	0.47	0-4	0.00	1.80	1.07	0.46
BAI_GD	51	0.47	0.49	0-3	0.00	1.80	1.19	1.11
BAI_SA	51	0.22	0.28	0-3	0.00	0.92	1.19	0.12

Note. PA = Positive Affect (NA = Negative Affect) items of the Positive and Negative Affect Scale; HRSD = Hamilton Rating Scale for Depression, HRSA = Hamilton Rating Scale for Anxiety, BDI = Beck Depression Inventory, BAI = Beck Anxiety Inventory, ANH = Anhedonia, GD = General Distress, SA = Somatic Anxiety; HRSD_ANH refers to items from the HRSD consistent with ANH, etc.

Confirmatory Factor Analyses with Factor ANH, GD, and SA

Confirmatory factor analysis (CFA) was performed with all twelve parcels serving as indicator variables and three structural correlated factors representing ANH, GD, and SA. The intention of the CFA was to test whether symptom clusters representative of the tripartite model components can be distinguished in the current data. For the purpose of testing a specific, theoretically derived factor structure, CFA is considered more appropriate than exploratory factor analytic techniques. It provides a more stringent test of an a priori hypothesized factor structure and allows for a direct comparison of the hypothesized model to alternative models.

The program AMOS 4.0 (Arbuckle, 1999) was used to perform all structural equation modeling (SEM) including these CFAs and all latent growth analyses below. Casewise maximum likelihood (ML) estimation was used to address the presence of missing data. Compared to other methods such as listwise deletion or imputation methods, ML estimation has been found to provide more efficient estimates when data are missing completely at random or at random and reduce bias caused by data missing for other reasons (e.g., Arbuckle, 1996).

The following indices were chosen to evaluate model fit: the chi-square goodness-of-fit statistic (χ^2; described, for example, in Hu & Bentler, 1998), the comparative fit index (CFI; Bentler, 1990), the Tucker-Lewis Index (TLI; Tucker & Lewis, 1973), and the root mean squared error of approximation (RMSEA; Steiger & Lind, 1980). At a general level, these indices all estimate discrepancies between the relations among the measured variables (i.e., the observed covariance matrix) to the relations among the variables implied by the model (i.e., the hypothesized covariance matrix).

The chi-square test is one of the most widely used fit indices in SEM research, which tests the null hypothesis that the model provides a perfect fit. Thus, a significant chi-square test typically suggests *lack of* model fit, i.e. "a significant amount of actual covariance between measures remains unexplained by the model" (Cole, 1987, p. 585). One of the advantages of the chi-square test is its sensitivity to model misspecification; disadvantages include high sensitivity to violations of multivariate normality and to sample size. For larger sample sizes and non-normal data, it reaches significance with rather small discrepancies between the covariance matrix predicted by the model and the actual one derived from the data. A significance level of $p = 0.05$ is frequently considered too stringent and other conventions for adequate model fit include a ratio of the chi-square statistic to the degrees of freedom of less than 3 (Carmines & McIver, 1981) or 5 (Wheaton, Muthén, Alwin, & Summers, 1977).

The chi-square test is also used as a tool for comparing hierarchically nested models in the present study. Models are hierarchically nested when one model can be derived from the other by fixing one or more variables (Loehlin, 2004, p. 62). The difference (Δ) between the chi-square statistics from two nested models is also distributed as chi-square. The degrees of freedom (df) for this chi-square difference test equals the difference between the df's of the separate chi-square tests. A significant chi-square difference test indicates that one model provides significantly better fit for the data than the other.

It is recommended to use a variety of different fit indices which vary in strengths and weaknesses (Hu & Bentler, 1998). Thus, in addition to the chi-square test, CFI and TLI were chosen because they are less sensitive to fluctuations in distributions and sample size (Hu & Bentler, 1998). Unlike the CFI, the TLI rewards for parsimony of the model. According to Hu and Bentler (1998), for both CFI and TLI, values of .095 or greater

indicate good fit in structural equation models. Finally, the RMSEA, like the chi-square test, has a known distribution which allows for the calculation of a confidence interval and a significance level for the estimated fit. In general, a RMSEA 0.06 or less indicates good fit (Hu & Benter, 1998). CFI, TLI, and RMSEA have all been shown to have high sensitivity to a variety of model misspecifications (for reviews of these and other fit indices, see Bentler & Bonett, 1980 and Hu & Bentler, 1998).

In order to assure independent observations, only one set of observations (i.e., one time point) was included in the analyses. Although post-treatment data do not include all participants (due to attrition), which may present a possible bias for the model estimates, week 16 data were chosen in order to assure maximal range of scores. Intake data were expected to have highly restricted variance in ANH and GD due to the severe levels of depression. Restricted variance artificially boosts correlations among observed variables and poses problems for the identification of separate factors.

Given that parcels were derived from different measures, variability between parcels was expected to be in part due to method variance. Assessment methods in this study were grouped into self-report versus interview-based assessment. Therefore, two (correlated) method factors, Self (indicating self-reported data) and Interview (indicating data collected via clinical interview) were included in the model. All factor variances were fixed at one. Error term variances were estimated for the observed variables. Loadings for error terms were fixed at one. In addition, intercept terms were estimated for observed variables as part of the ML estimation for missing data.
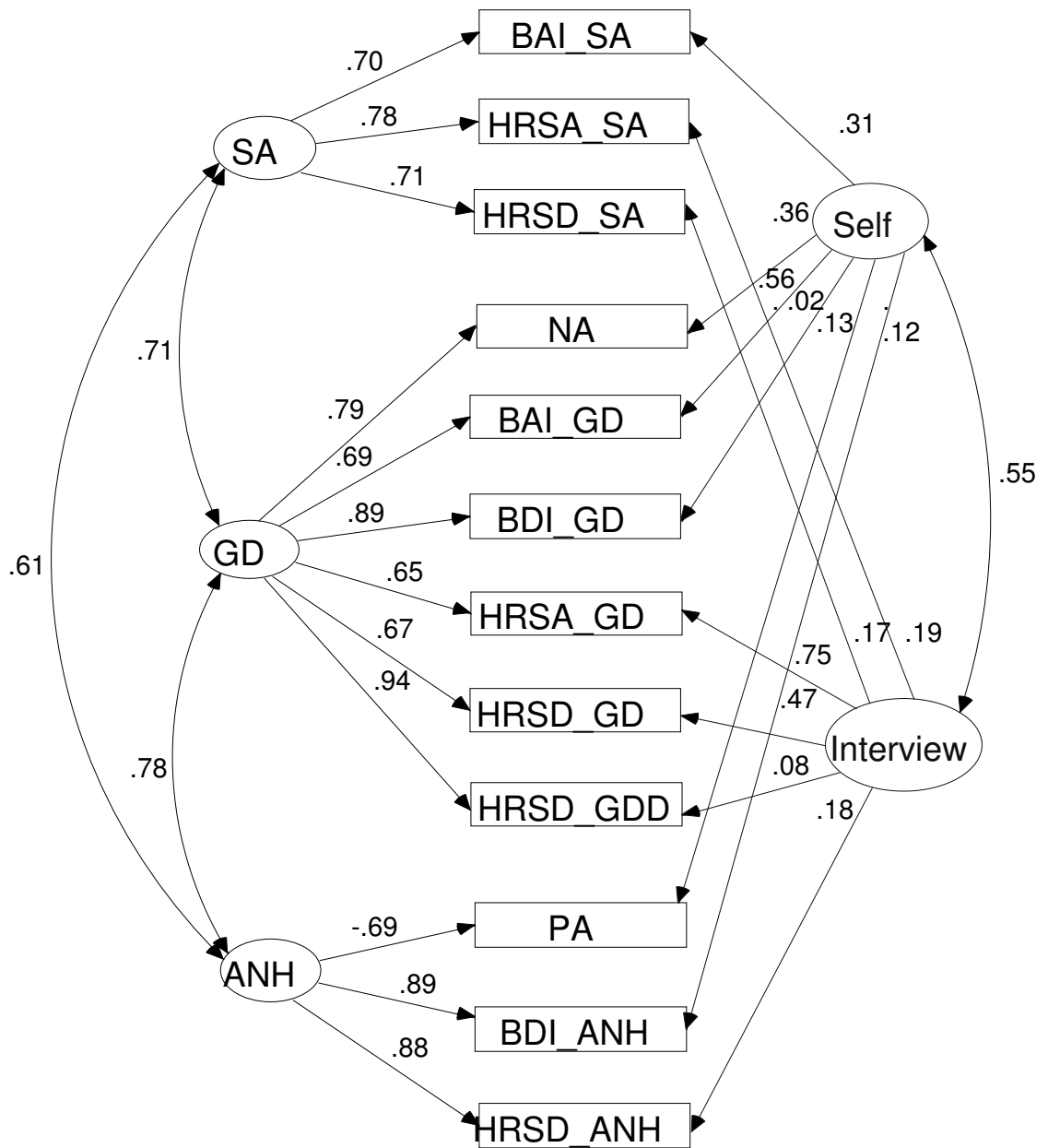
Figure 2. Three-Factor Model (Standardized Solution). N = 159 (data collected at week 16).
ANH = Anhedonia factor; GD = General Distress factor; SA = Somatic Anxiety factor; Self =
Self-Report method factor; Interview = Interview-based method factor. For description of
parcels, see Table 2. Factor variances were fixed at one in order to avoid under-identification of
the model. Parameter estimates associated with the curved arrows indicate correlations between
factors. Straight arrows indicate one-directional influences. Error terms are omitted from the
figure for clarity.

A drawing of the tested CFA model with standardized parameter estimates is depicted in Figure 2. Fit indices for this three factor model (N=159) indicated excellent global fit: χ^2 (df = 38, N= 159) = 40.20, p = 0.373, comparative fit index (CFI) = 1.000, Tucker-Lewis Index (TLI) = 1.000, root mean squared error of approximation (RMSEA) = 0.019, 90% CI = [0.000, 0.060]. The necessity of the method factors was tested by direct comparison of the original three-factor model with a nested model without the method factors (i.e., with loadings and covariance of the method factors constraint to zero). The chi-square difference test indicated significant deterioration of model fit ($\Delta\chi^2$ (13) = 110.68, p = 0.000) strongly arguing for the requirement of method factors or alternative ways of modeling method variance such as allowing error terms to correlate.

The three-factor model and the standardized parameter estimates are depicted in Figure 2. All factor loadings for the structural factors were highly significant (all $p <$ .001) and consistent with the tripartite model. As can be seen in Figure 2, correlations among the latent constructs ANH, GD, and SA were fairly high (ranging from .61 to .78) and highly significant (for all, $p <$ .001). These high correlations indicate that the constructs share a significant amount of variance. Correlation between the two method factors was also highly significant ($p <$ .001).

The three-factor model was further compared to a four-factor and a two-factor model. The proposed four-factor structure was informed by empirical work by Watson et al. (1995a, b) and by Burns and Eidelson (1998) and divides the GD factor into GDD and GDA (see Figure 3).

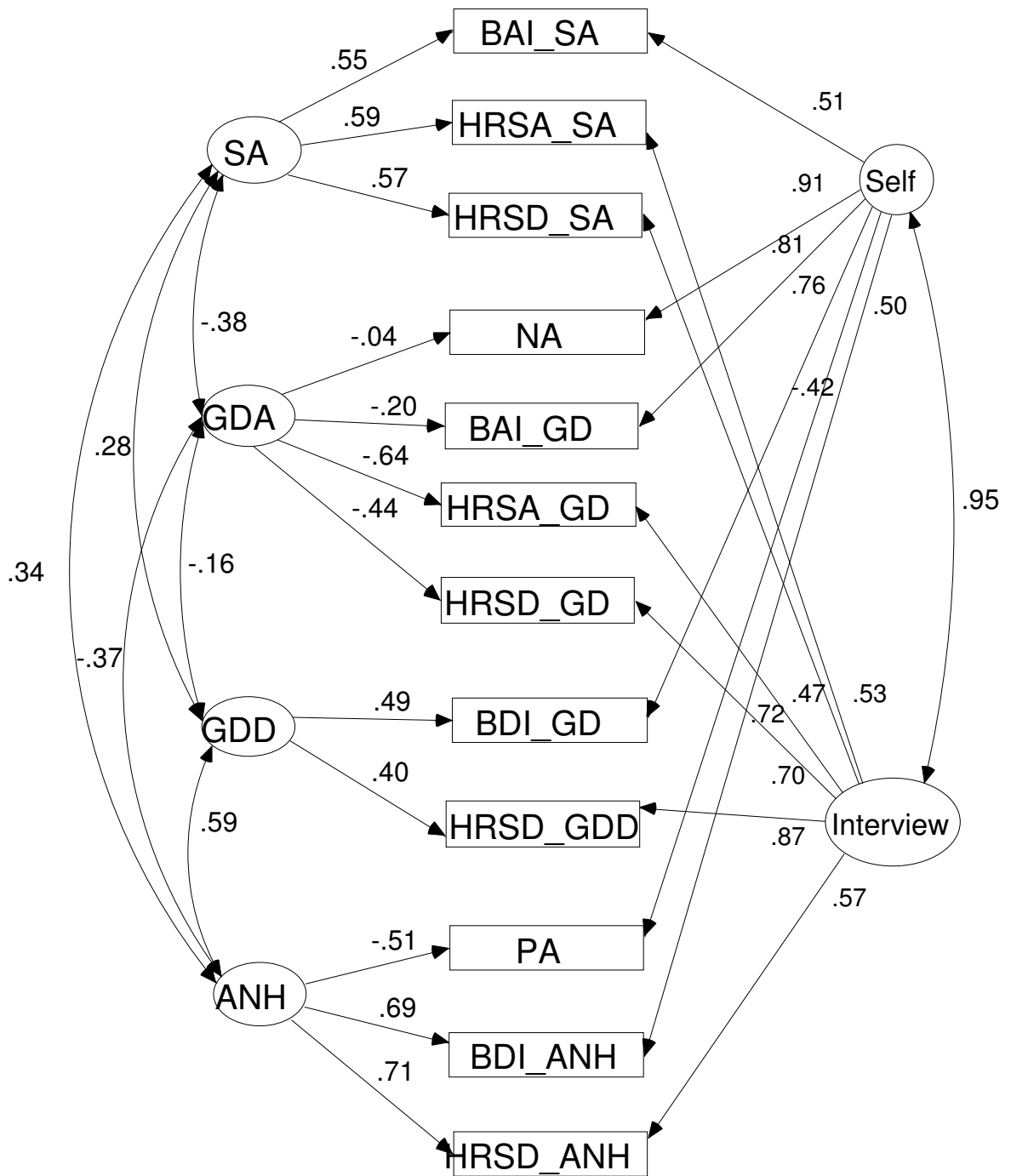*Figure 3.* Four-Factor Model (Standardized Solution). N = 159 (data collected at week 16). GDD = General Distress Depression factor; GDA = General Distress Anxiety factor; see Figure 2 for a description of the remaining factors, and model features.

Fit indices indicated very good fit for the four-factor model as well (χ^2 (df = 35, N = 159) = 46.58, p = 0.091, CFI = 0.999, TLI = 0.998, RMSEA = 0.046, 90% CI = [0.000, 0.078]). Direct comparison indicated a non-significant trend for the three-factor model to be superior to the four-factor model ($\Delta\chi^2$ (3) = 6.38, p = 0.096). There were several aspects of four-factor model, which made it difficult to interpret. Problems included the fact that factor loadings were less consistent with the tripartite model and in fact, appeared less interpretable in general. Method factors were highly correlated (.95) making them nearly indistinguishable. Parcels loaded consistently more highly on the method factors than on the four structural factors meaning that the "method factors" accounted for more of the variance in the parcels than the other factors and suggesting that in fact they accounted for variance other than that due to shared methods. In sum, in the presented form, the four-factor model, though statistically providing good fit for the data, is difficult to interpret theoretically and therefore a poor model.

In addition, a two-factor model was tested for which the factors ANH and GDD were merged to a factor for Depression, and GDA and SA were merged to form a factor for Anxiety. Fit indices suggest a poor fit of the two-factor structure (χ^2 (df = 41, N = 159) = 107.44, p = 0.000, CFI = 0.994, TLI = 0.989, RMSEA = 0.101, 90% CI = [0.078, 0.125]). Although the two-factor model could not be directly compared to the three-factor model (as they were not nested), direct comparison to the four-factor model indicated a significantly inferior fit for the former ($\Delta\chi^2$ (6) = 60.86, p < 0.001). Given that the four-factor model was itself inferior to the three-factor model (at the level of a non-significant trend), this suggests that the two-factor structure was also inferior to the three-factor structure.

As tests of invariance of the individual constructs (described below) revealed instability of GD across time, three of the six parcels loading on GD were removed from the model (HRSD_GDD, BDI_GD, and BAI_GD). The resulting narrower construct of GD was based on the parcels HRSD_GD, HRSA_GD and NA and was more stable across time. This "reduced three-factor model" (depicted in Figure 4) also fit the data very well (χ^2 (df = 14, N = 159) = 11.20, $p = 0.671$, CFI = 1.000, TLI = 1.001, RMSEA = 0.000, 90% CI = [0.000, 0.062]). Figure 4 shows that factor loadings for the factors ANH, GD, and SA were high (and significant with $p < .001$ in all cases) indicating further consistence with the hypothesized three-factor structure. Correlations among the
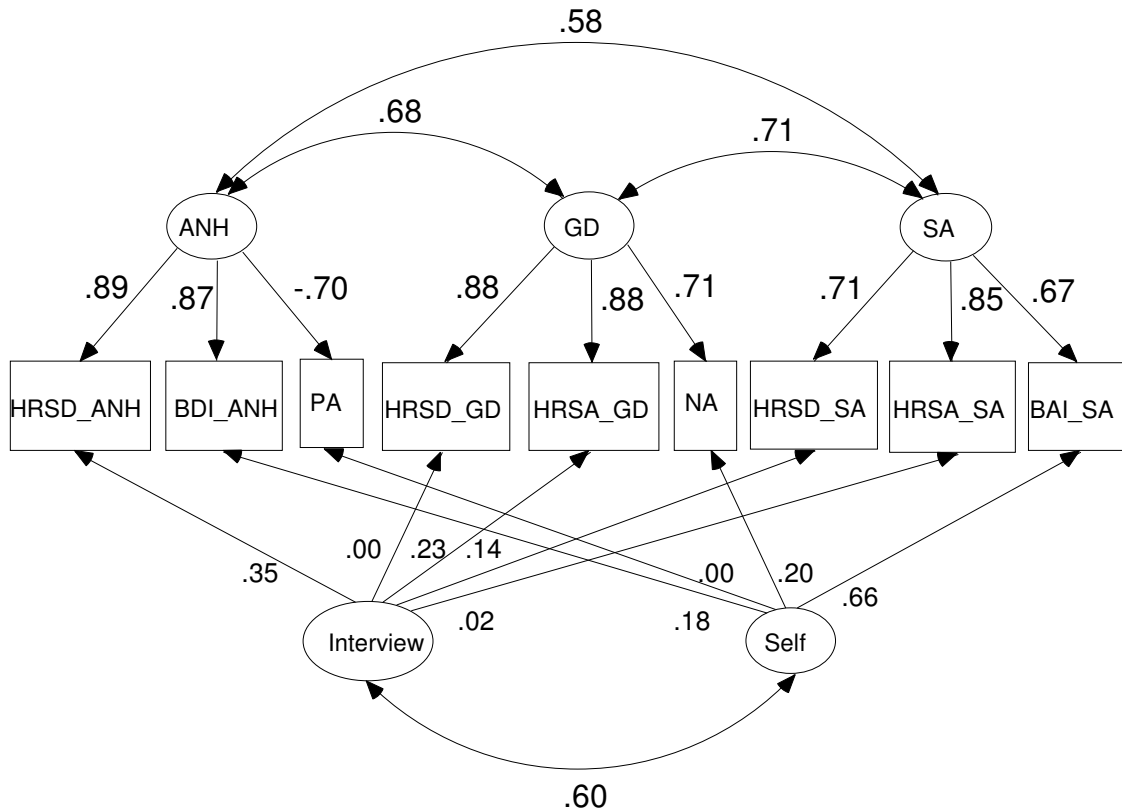

Figure 4. Reduced Three-Factor Model (Standardized Solution). N = 159. Factors and other features of the model are equivalent to the original three-factor model in Figure 2.

latent constructs ANH, GD, and SA were slightly smaller than in the original three-factor model (Figure 2) and were also significant (for all, $p < .001$). Correlation between the method factors was not significant at the .05 level.

In sum, for purposes of the present study, the three-factor model found good support in the present data. Yet, it should be emphasized that the present study does not claim to directly evaluate the construct validity of the tripartite model structure. Many other, statistically equivalent and non-equivalent models may fit the data equally well or even better (e.g., MacCallum, Wegener, Uchino, & Fabrigar, 1993; for a discussion see Tomarken & Waller, 2003).

Testing for Measurement Invariance Across Time and Groups

Before growth and treatment effects in the latent constructs ANH, GD, and SA, were modeled, measurement invariance of these constructs across time and groups was assessed. Meaningful interpretation of change in latent constructs across time as well as between-group differences relies on the assumption that the *same* construct is assessed across time and across groups. Yet, even the use of equivalent measures across time and groups alone does not assure measurement invariance (particularly with relatively small sample sizes like the ones in the present study). Various different components of a model could be (individually or simultaneously) tested for invariance (e.g., residual factor variances, error term variances and covariances, etc.), yet methodology experts seem to agree that the invariance of factor loadings, i.e. the mapping of observed variables onto latent variables, is the key issue of interest in this context (e.g., Alwin & Jackson, 1981; T. E. Duncan, S. C. Duncan, Strycker, Li & Alpert, 1999).

Invariance of factor loadings (hereafter also referred to as 'construct invariance' or 'construct stability') was tested across three time points (intake, week 8, and week 16) and across groups (PT and CBT) using nested models. Baseline models with freely estimated factor loadings (depicted in Figure 5) were compared to restricted (yet otherwise identical) models with factor loadings constrained to be equal across time and/or across groups. The chi-square difference test was used in order to assess whether equality constraints led to significant deterioration in model fit, which in this case would indicate a lack of invariance.

For both baseline and restricted models, variances and covariances of latent constructs were freely estimated and not constrained to be equal. Error term variances were freely estimated and allowed to covary for equivalent parcels across time. The rational for the allowance of correlated error variances were the shared assessment methods[1]. First, invariance across time (i.e., factor loadings constraint to be equal across time) was tested for each group separately, and then invariance across time and across groups was tested in analyses combining both groups.

As can be seen in Table 3, these constraints did not lead to significant deterioration in model fit in any of the constructs when tested separately for CBT and PT ($p \geq 0.074$ for all chi-square difference tests). After establishing sufficient stability of each construct across time separately for each group, invariance was tested jointly for both groups in two-group latent variable models.

---

1 Intercepts of latent constructs were fixed at zero. Intercepts for observed variables were freely estimated. Error intercepts were fixed at zero. For GD, one error variance and some of the error covariances were set to zero as noted in Table 3.
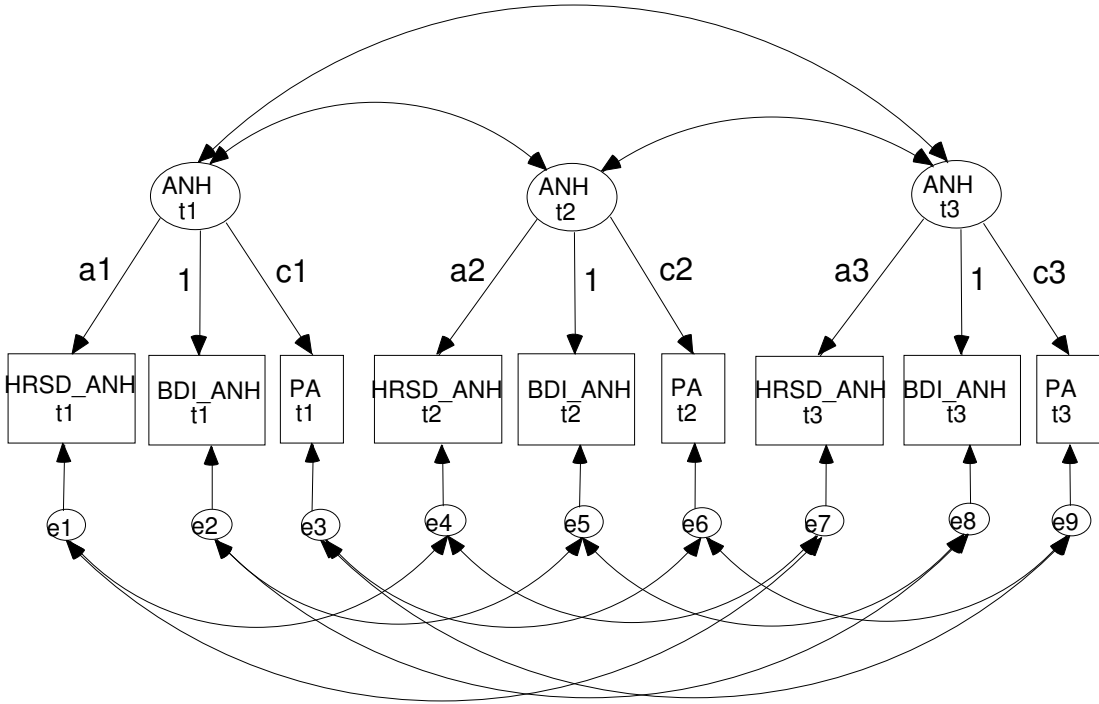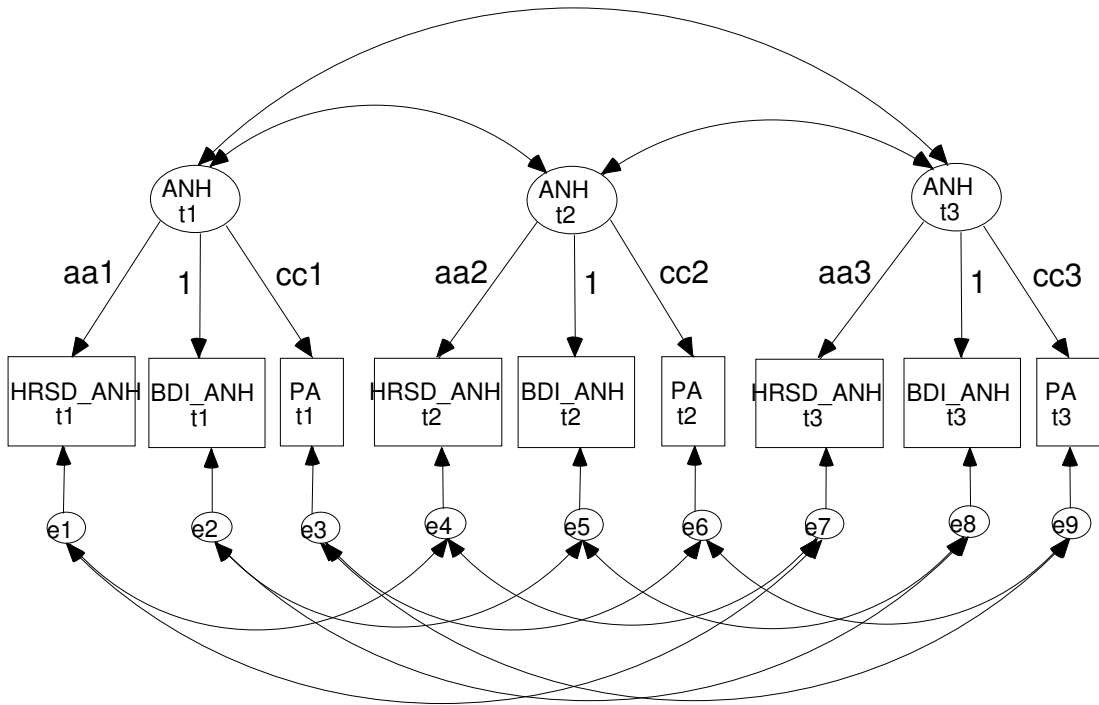
Figure 5. Hypothesized Model Involving Two Groups (PT and CBT) Testing Measurement Invariance across Time and Groups. ANH t1-3 = Anhedonia Factor at time of intake, week 8, and week 16, respectively. HRSD_ANH t1 = parcel HRSD_ANH assessed at intake, HRSD_ANH t2 = parcel HRSD_ANH assessed at week 8, etc. Equal labels of factor loadings indicate factor loadings constrained to be equal; e1 – e9 = error terms. For description of parcels, see Table 1.

47

Table 3

Fit Statistics for Models testing Measurement Invariance across Three Time Points (intake, week 8, and week 16), for both Groups Individually and Combined

Model	χ^2	df	$\chi^2/$ df	TLI	RMSEA	Compare to	$\Delta\chi^2$	Δ df	$\Delta\chi^2/$ df	p
Anhedonia: Medication group (N = 119)										
I. Baseline	22.55	15	1.50	0.996	0.065					
Invariance across time	23.65	19	1.25	0.998	0.046	I	1.11	4	2.78	0.893
Anhedonia: Cognitive therapy group (N = 62)										
II. Baseline	9.58	15	0.64	1.005	0.000					
Invariance across time	18.10	19	0.95	1.001	0.000	II	8.52	4	2.13	0.074
Anhedonia: Both groups (N =181)										
III. Baseline: no constraints	32.11	30	1.07	0.999	0.020					
Invariance across time	41.78	38	1.10	0.999	0.024	III	9.67	8	1.21	0.289
Invariance across groups	38.91	36	1.08	0.999	0.021	III	6.80	6	1.13	0.340
Invariance across time & groups	41.89	40	1.05	1.000	0.016	III	9.77	10	0.98	0.461
General Distress: Medication group (N = 119)										
I. Baseline	19.45	15	1.30	0.998	0.050					
Invariance across time	20.88	19	1.10	0.999	0.029	I	1.43	4	0.36	0.839
General Distress: Cognitive therapy group (N = 62)										
II. Baseline	23.68	18	1.32	0.996	0.072					
Invariance across time	30.92	22	1.41	0.994	0.082	II	7.24	4	1.81	0.124
General Distress: Both groups (N =181)										
III. Baseline: no constraints	44.74	36	1.24	0.998	0.037					
Invariance across time	53.97	44	1.24	0.998	0.036	III	9.24	8	1.16	0.323
Invariance across groups	63.57	42	1.51	0.995	0.054	III	18.84	6	3.14	0.004
Invariance across time and groups	68.68	46	1.49	0.995	0.052	III	23.95	10	2.40	0.008

Table 3, continued

Fit Statistics for Models testing Measurement Invariance Across Three Time Points (intake, week 8, and week 16), for Both Groups Individually and Combined

Model	χ^2	df	$\chi^2/$ df	TLI	RMSEA	Compare to	$\Delta\chi^2$	Δ df	$\Delta\chi^2/$ df	p
Somatic Anxiety: Medication group (N = 119)										
I. Baseline	15.34	15	1.02	1.000	0.014					
Invariance across time	17.88	19	0.94	1.000	0.000	I	2.54	4	0.64	0.637
Somatic Anxiety: Cognitive therapy group (N = 62)										
II. Baseline	19.29	15	1.29	0.996	0.068					
Invariance across time	27.06	19	1.42	0.994	0.083	II	7.77	4	1.94	0.100
Somatic Anxiety: Both groups (N =181)										
III. Baseline: no constraints	34.69	30	1.16	0.998	0.030					
Invariance across time	45.03	38	1.19	0.998	0.032	III	10.35	8	1.29	0.242
Invariance across groups	45.20	36	1.26	0.998	0.038	III	10.51	6	1.75	0.105
Invariance across time and groups	56.01	40	1.40	0.996	0.047	III	21.32	10	2.13	0.019

Note. χ^2 = chi-square test for model fit, df = degrees of freedom, TLI = Tucker-Lewis Index, RMSEA = root mean squared error of approximation, $\Delta\chi^2$ = chi-square test for difference in model fit, Δdf = degrees of freedom for the chi-square test for difference in model fit. Baseline Model refers to all factor loadings being freely estimated, invariance across time refers to a1=a2=a3, c1=c2=c3, aa1=aa2=aa3, and cc1=cc2=cc3, invariance across groups refers a1=aa1, c1=cc1, a2=aa2, etc., invariance across time and groups refers to the combination of constraints across time and groups. In order to fit the model of construct GD for group CT, the error term for parcel HRSA_GD at t2 as removed. In the simultaneous test for invariance in both groups, error covariance was set to zero in the PT group for the parcels HRSA_GD between t1 and t3 and HRSA_GD between t2 and t3; for CT, error variance for HRSA_GD at t2 and error covariance for this parcel across different time points was constrained to zero.

As displayed in Table 3, tests again indicated sufficient invariance of all constructs across time ($p \geq 0.242$ for all chi-square difference tests). In addition, ANH was found to be invariant across treatment groups ($p = 0.340$) and jointly across time and groups ($p = 0.461$). For GD, invariance across time could be established ($p = 0.323$), but significant deterioration in fit of the model was detected when factor loadings were

constrained to be invariant across groups ($p = 0.004$) and jointly across groups and time ($p = 0.008$). A number of interrelated factors may have contributed to these results including (a) uneven sample size in the two treatment conditions (N = 119 in PT and N = 62 in CBT), (b) relatively small sample size in the CT group (not counting missing data, the actually available N varied by parcel from 56 to 62 at intake, from 52 to 53 at week 8, and from 53 to 54 at week 16), (c) a between-group difference in the factor structure of GD before treatment, and (d) a change of the factor structure with treatment at least in one of the groups. As the cause(s) of these findings cannot be disentangled at this time, caution is warranted with regard to the interpretation of between-group (PT versus CBT) differences in change of GD over time. Variability in the measurement of GD across groups and across time may have raised the likelihood of obtaining significant effects for treatment or other predictors.

For SA, measurement invariance could be established separately across groups ($p = 0.11$) and across time ($p = 0.24$). Joint invariance across time and groups was less clear. The Chi-square difference test indicated a significant difference between the fully constrained and the fully unconstrained model indicating lack of invariance ($p = 0.019$). However, change in other fit indices was fairly small (change in TLI = 0.002, change in RMSEA = 0.017) and thus findings with regard to growth models and predictors of growth in SA are considered sufficiently valid.

Modeling Growth

Latent growth modeling (LGM) was used to investigate change and predictors of change in the constructs ANH, GD, and SA. LGM was chosen as data analytic technique for its advantages over more traditional methods. LGM uses SEM methodology to

estimate individual growth trajectories as well as interindividual differences between these trajectories. Compared to classic repeated measures analysis of variance (ANOVA), which treats within-group variability as error, LGM is therefore better able to address method variance and random changes in measurement error across time. In addition, it can more flexibly address heterogeneity in error covariance, and missing data (e.g., Duncan et al., 1999; Tomarken & Waller, 2005; Willet & Sayer, 1994). These advantages are expected to translate into increased power and a more accurate reflection of the sample characteristics. In addition, the SEM methodology (as described above for CFA) offers the unique opportunity to evaluate actual fit of the hypothesized model used to generate parameter estimates.

A standard first-order LGM, illustrated in Figure 6, describes individual growth curves for variable (V) over time. V1 through V3 represent scores for a given individual for the same observed variable across three equally spaced time points. The first factor "Intercept" represents the initial (or average) score of V for a given individual. The second factor "Slope" indicates the rate of change in this variable for this individual, and the third factor "Quad" indicates the quadratic component or curvature of the change trajectory of this variable for this individual. All three factors have means and variances which respectively reflect the average tendency and variability of trajectories across individuals in the sample. Parameterization for the hypothesized model was informed by Duncan et al. (1999) and Hancock, Kuo, and Lawrence (2001). In Figure 6, the growth factors are allowed to covary. For reasons described above, residual error terms of equivalent variables (in this case *the one* observed variable) are also typically allowed to covary across time.

51
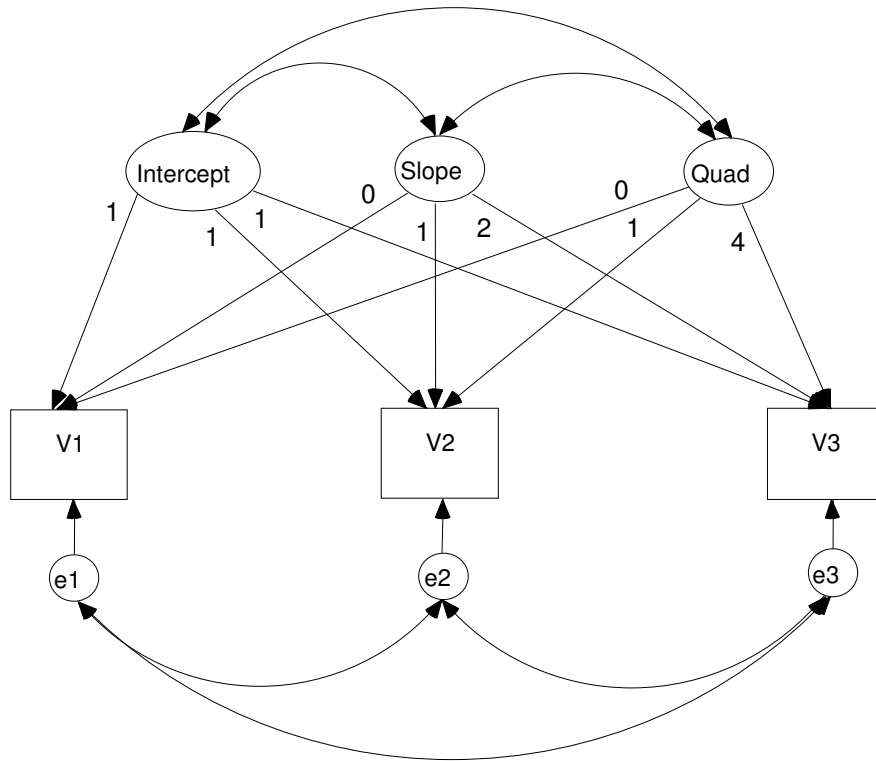
Figure 6. Representation of a Polynomial Latent Growth Model. V1 –V3 = variable across three equally spaced time points, Intercept = factor representing the intercept of the growth trajectory, Slope = factor representing rate of change in the variable, Quad = factor representing curvature of change, e1-e3 = error terms. Means and variances are omitted from this representation for clarity.

For the following analyses, *second-order latent growth models* with multiple indicators were used to investigate patterns of change for each of the three latent constructs over the course of treatment. Specifically, the type of growth modeling used here has been referred to as "curve-of-factor model" (McArdle, 1988), "latent variable longitudinal curve model" (Tisak & Meredith (1990), and "second-order latent growth model" (Hancock, Kuo, & Lawrence, 2001). Unlike first-order growth modeling of one observed variables (described above), second-order LGM represents growth in latent constructs assessed via multiple indicators. Given the fallibility of any individual indicator in the assessment of a given construct, the use of multiple indicators is typically

preferable. This is particularly true in the present situation as no direct and validated

measure of the constructs ANH, GD, and SA was available. Figure 7 displays the model

for the latent construct ANH; models for the constructs GD and SA were equivalent (the

variable Treat will be explained further below).
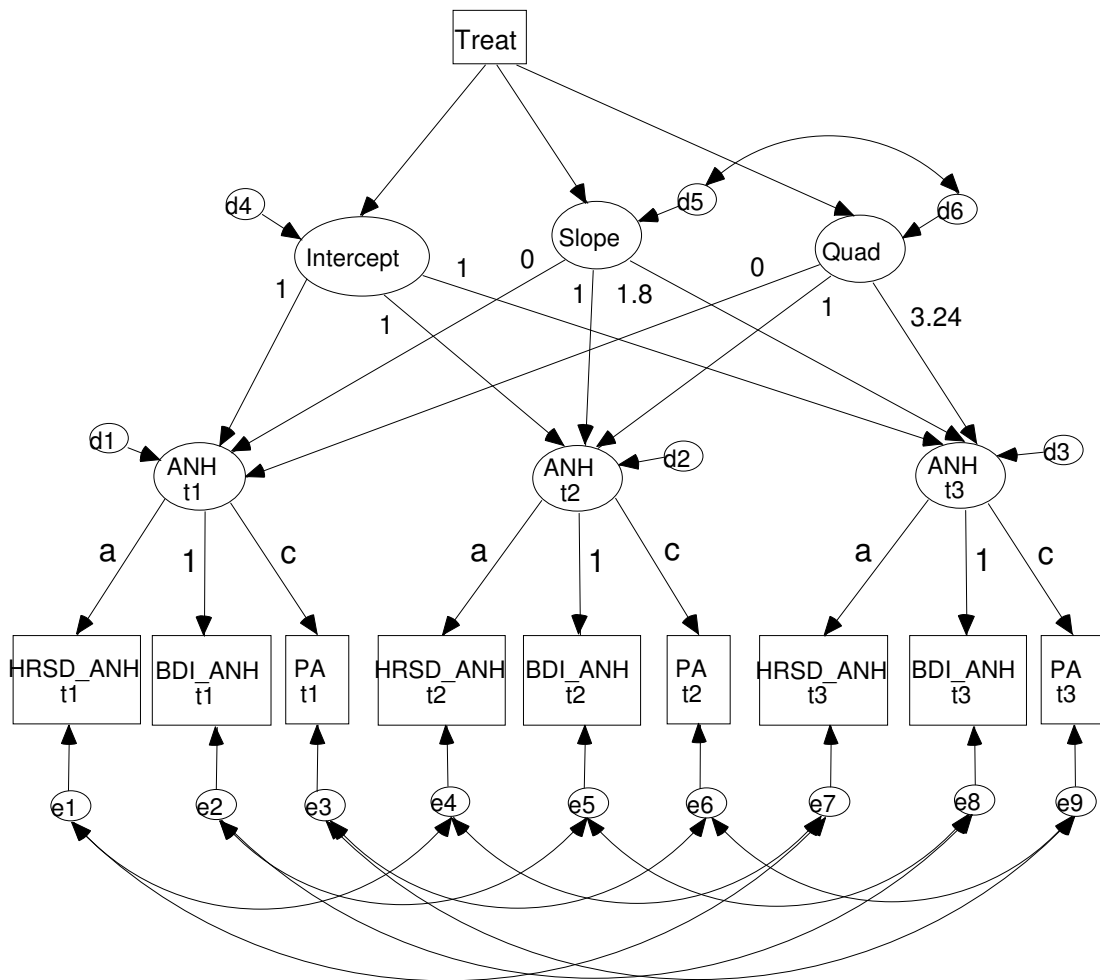
Figure 7. Hypothesized Second-Order Latent Growth Model with Treatment as Predictor
(Dummy) Variable. d1-d6 = residual variance terms for the factors; e1-e9 = residual error terms
for the observed variables; for description of observed variables and factors, see Figures 2 and 5;
factor loadings for first-order factors were constrained to be equal across time with parcel
BDI_ANH was used as metric for the first-order factors; parameterization for second-order
growth factors followed Duncan et al. (1999) and reflects an interval of ten weeks between t1 and
t2 and 8 weeks between t2 and t3.

Generally, in order to provide a scale for the first-order factors, either their variances have to be fixed or one of the observed indicators is chosen to determine a metric for it. The latter is performed by fixing the factor loading for this indicator at one for all time points. In the present study, variances for first-order constructs were freely estimated and one of the indicators served as metric. As can be seen in Figure 7, indicator BDI_ANH served as metric for ANH (HRSA_GD served as metric for GD and HRSA_SA served as metric for SA); factor loadings for the remaining indicator variables were estimated, but constrained to be equal across time. Intercepts for equivalent observed variables were constrained to be equal across time reflecting the assumption that equivalent indicator variables share the same intercept across time, and differ only as a function of growth (and error variance). Error variance and covariance were freely estimated with the exception noted in Table 3. Disturbances for first-order factors were constrained to be equal across time in order to prevent under-identification of the model; intercepts for these factors were fixed at zero.

Second-order factors reflect the growth factors discussed above with Intercept representing pre-treatment status in the latent construct, whereas Slope and Quad together represent the pattern of growth in the construct across time. The quadratic factor was included in order to test hypotheses regarding treatment effects on curvature of the trajectories. The slope and the quadratic growth factors were expected to be correlated and were thus allowed to covary. Factor loadings for the growth factors follow standard procedures for growth modeling (e.g., Duncan et al., 1999) and took into account non-equal spacing of time points. Intake assessment took place approximately two weeks before the start of active treatment creating an average time interval of ten weeks between time 1 (intake) and time 2 (week 8). This time interval was defined as *one* unit. The time

54

interval between time 1 and time 3 (week 16) therefore equaled 1.8 time units (i.e., 18 weeks). Consequently, factor loadings were 0, 1, and 1.8 for the slope factor and 0^2, 1^2, and 1.8^2 for the quadratic factor. To illustrate, growth in the latent construct ANH can also be expressed in the following equations:

$$\text{ANH t1} = 1 \text{ (Intercept)} + 0 \text{ (Slope)} + 0^2 \text{ (Quadratic)} + \text{d1} \quad\quad (1)$$

$$\text{ANH t2} = 1 \text{ (Intercept)} + 1 \text{ (Slope)} + 1^2 \text{ (Quadratic)} + \text{d2} \quad\quad (2)$$

$$\text{ANH t3} = 1 \text{ (Intercept)} + 1.8 \text{ (Slope)} + 1.8^2 \text{ (Quadratic)} + \text{d3} \quad\quad (3)$$

Ignoring interindividual differences, the average growth trajectory for ANH is defined by time points 1, 2 and 3. As can be seen in equation (1), ANH at time 1 equals the estimated mean of the intercept factor plus unexplained residual variance of ANH at intake (no growth is added). The level ANH at time 2 is calculated by taking the estimated mean of the intercept factor and adding (one unit of) the estimated mean of the slope factor, (one unit of) the estimated mean of the quadratic factor, and a term representing unexplained variance of ANH at time 2 (equation 2). Finally, the level of construct ANH at time 3 is calculated equivalently to that at time 2 except that 1.8 units of the estimated slope mean and 1.8^2 units of the quadratic means were added to the intercept mean (equation 3).

Table 4 summarizes the fit statistics for the fitted growth models for ANH (model I.a), GD (model II.a), and SA (model III.a). Fit indices indicated adequate model fit for ANH (χ^2 / df = 1.77, TLI = 0.996, RMSEA = 0.065; see Table 4 model I.a.) and for SA (χ^2 / df = 1.68, TLI = 0.997, RMSEA = 0.062; see Table 4 model II.a.).

Table 4

Fit Statistics for Growth Models Assessing Change Trajectories in Anhedonia (ANH), General Distress (GD), and Somatic Anxiety (SA) Across Three Time Points (intake, week 8, and week 16); N = 181 for Each Model

Model	χ^2	df	χ^2/ df	p	TLI	RMSEA estimate	RMSEA 90% CI
Anhedonia							
I.a. Growth model without predictor	42.53	24	1.77	0.011	0.996	0.065	0.031- 0.097
I.b. Growth model with treatment as predictor	49.84	30	1.66	0.013	0.996	0.061	0.028- 0.090
General Distress							
II.a. Growth model without predictor	52.26	24	2.18	0.001	0.994	0.081	0.051- 0.111
II.b. Growth model with treatment as predictor	60.04	30	2.00	0.001	0.994	0.075	0.047- 0.102
Somatic Anxiety							
III.a. Growth model without predictor	40.40	24	1.68	0.019	0.997	0.062	0.025- 0.094
III.b. Growth model with treatment as predictor	44.62	30	1.49	0.042	0.997	0.052	0.010- 0.082

Note. χ^2 = chi-square test for model fit, df = degrees of freedom, TLI = Tucker-Lewis Index, RMSEA = root mean squared error of approximation, CI = Confidence Interval.

For GD, model fit was questionable (χ^2 / df = 2.18, TLI = 0.994, RMSEA = 0.081; see Table 4 model III.a.), which was likely related to the lack of construct stability noted above. Given that (in the present form of growth modeling) measurement invariance is assumed (which may present a misspecification of the growth model for GD), parameter estimates may be biased (e.g., Tomarken & Waller, 2005). This issue will be addressed below with regard to the interpretation of significant findings.

As depicted in Table 5, estimated intercepts of the growth parameters in models I.a., II.a., and III.a. were significantly different from zero. The estimated pre-treatment status was positive and significant ($p < 0.001$ for all three constructs), indicating that levels in all three constructs ANH, GD, and SA were significantly different from zero at the time of intake.

Table 5

Estimated Nonstandardized Parameters from Fitted Growth Models I.a. (ANH), II.a. (GD), and III.a. (SA) examining Growth Parameters (N = 181 for Each Model)

Estimated growth parameters	ANH		GD		SA	
	parameter	*p*	parameter	*p*	parameter	*p*
Estimated average initial status (intercept)	1.910	***	1.861	***	1.747	***
Estimated variance in initial status	0.002	***	0.002	***	0.001	***
Estimated average rate of change (per 10 weeks) (slope)	-0.178	***	-0.142	***	-0.070	***
Estimated variance in rate of change	0.021	***	0.012	**	0.003	0.234
Estimated average curvature change of trajectory (per 10 weeks) (quadratic)	0.044	***	0.036	***	0.021	***
Estimated variance in average curvature of change trajectory	0.005	***	0.003	0.052	0.000	0.581

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The estimated rate of change was significant and negative ($p < 0.001$ for all three constructs), whereas the estimated curvature of change was significant and positive ($p < 0.001$ for all three constructs), indicating that, on average and for both treatment groups

combined, ANH, GD, and SA decreased significantly over the course of the study   with more change occurring in the first half than in the second half of treatment.

Before attempting to predict some of the variance of these growth parameters, it should be established that they had significant interindividual variability. The initial status in ANH, GD, and SA was found to be highly variable between individuals (for all three constructs, variance was significantly different from zero, $p < 0.001$). Variability in rate of change was found to be significant for ANH ($p < 0.001$) and for GD ($p < 0.01$), but not for SA ($p = 0.234$). Variability in the curvature of the trajectory was found to be significant for ANH ($p < 0.001$), yet just missed significance for GD ($p = 0.052$) and was clearly not significant for SA ($p = 0.581$). It is speculated that there was a "floor effect" with regard to improvement in SA. This speculation finds some support by the fact that two of the three parcels for SA, namely HRSA_SA and BAI_SA, started out with relatively small means compared to the other parcels ($M \leq 0.82$ at intake, for both parcels and in both groups, see Table 2) *and* the variability of these parcels decreased over the course of treatment (SD ranged from 0.45 to 0.57 at intake and from 0.26 to 0.47 at week 16), which was atypical. This pattern was not the case, however, for the third parcel, HRSD_SA, which showed comparable means and standard deviations to the other variables ($M \leq 2.06$ at intake for both groups; SD ranged from 0.65 to 0.68 at intake and from 0.87 to 1.00 at week 16). Regardless of the cause of these results, small variability in change factors makes the successful prediction of them statistically less likely, which should be kept in mind for the following investigation of predictors of change trajectories in the construct SA.

Treatment as Predictor of Change in ANH, GD, and SA

After fitting the basic growth models, a dummy variable representing treatment

(coded 0 for PT and 1 for CT) was included as predictor (depicted in Figure 7).

Treatment effects on average pre-treatment levels in each construct (intercept), average

rate of growth (slope factor), and average curvature of trajectory (quadratic factor) were

estimated. Table 4 summarizes the fit statistics for the models I.b (ANH), II.b (GD), and

III.b (SA). Again, fit was good for ANH (χ^2 / df = 1.66, $p < 0.05$, TLI = 0.996, RMSEA

= 0.061) and for SA (χ^2 / df = 1.49 $p < 0.05$, TLI = 0.997, RMSEA = 0.062), whereas

caution remains warranted with regard to construct GD (χ^2 / df = 2.00, $p < 0.005$, TLI =

0.994, RMSEA = 0.075). Table 6 summarizes the parameters (and significance levels)

estimating treatment effects on the second-order growth factors.

Table 6

Estimated Nonstandardized and Standardized Parameters from the Fitted Growth Models I.b. (ANH), II.b. (GD), and III.b. (SA), examining Treatment Effects on Change Trajectories over the Course of Treatment (N = 181 for Each Model)

Estimated treatment effects on growth trajectories	ANH (from model I.b)		GD (from model II.b)		SA (from model III.b)	
	Parameter (standardized)	p	Parameter (standardized)	p	Parameter (standardized)	p
Effect of treatment on initial status	- .007 (-.075)	.478	.006 (.066)	.576	.016 (.226)	*
Effect of treatment on rate of change	.056 (.180)	.063	.100 (.432)	***	.025 (.237)	.181
Effect of treatment on curvature of change trajectory	-.024 (-.162)	.112	-.049 (-.458)	***	-.019 (-.462)	*

Note. Significance levels were derived from the two-tailed Wald test assessing the likelihood for the parameter to be no different from zero. * $p < 0.05$, *** $p < 0.001$.

Figure 8 displays the growth trajectories based on growth parameter estimates derived from models I.b, II.b, and III.b. The trajectories are therefore based on log-transformed data. However, growth trajectories based on non-transformed were computed for comparison and were found highly similar. Presented trajectories are therefore fairly consistent with estimated patterns of change in the non-transformed latent constructs.
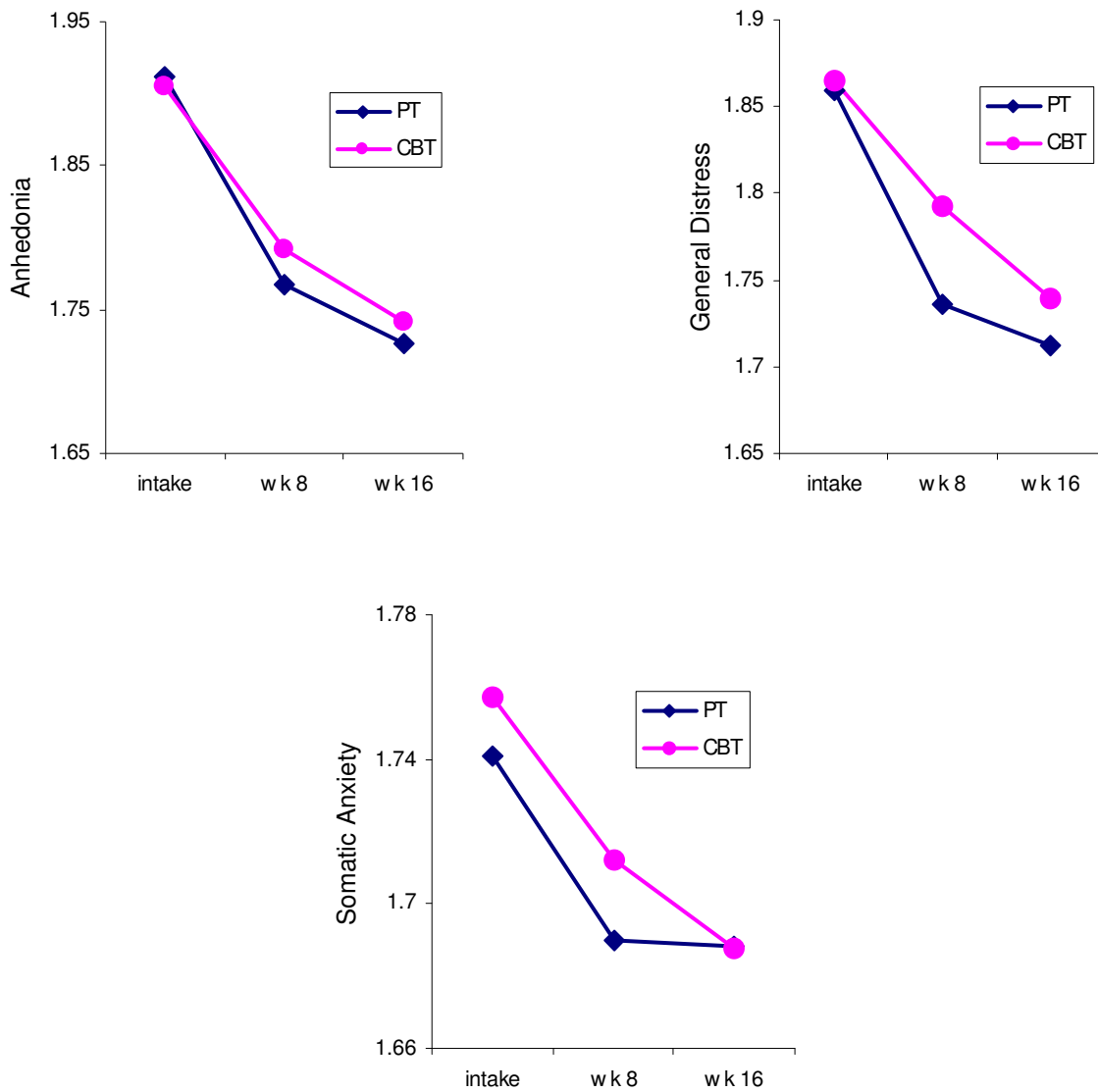

Figure 8. Estimated Average Growth Trajectories of Latent Constructs Anhedonia, General Distress, and Somatic Anxiety Comparing the Two Treatment Conditions, Pharmacotherapy (PT) and Cognitive Behavior Therapy (CBT). Parameter estimates were derived from models I.b. (Anhedonia), II.b. (General Distress), and III.b. (Somatic Anxiety).

No between-group differences were expected for initial levels in the constructs as patients were randomized to the treatment groups. Consistent with this expectation, no treatment effect was found for pre-treatment levels in ANH (Table 6, model I.b). Further, no significant treatment effects were found with regard to rate or curvature of change for ANH indicating that groups did not differ with regard to pattern of change in ANH over the course of treatment. There was a tendency for a higher rate of decrease in the PT than in the CBT condition, yet the difference did not reach significance (Table 6, model I.b, $p = 0.063$).

No treatment group differences in initial GD were found (Table 6, model II.b). Unlike for ANH, however, there was a highly significant treatment effect on both, the slope and the quadratic factor in GD (Table 6, model II.b, $p < 0.001$ in both cases). Together, this suggests a different pattern of change in GD for the two treatment conditions. As can be seen in Figure 8, GD decreased more rapidly in the PT condition than in the CBT condition. In fact, in the PT condition, most of the change in GD occurred within the first eight weeks of treatment while for CBT, the decrease in GD was more evenly distributed over the 16 weeks of treatment. Again, caution is warranted in the interpretation of these significant findings given the questionable model fit for GD, which will be addressed below.

For SA, surprisingly, treatment significantly predicted the intercept factor suggesting that the CBT group had higher pre-treatment levels on SA than the PT group (Table 6, model III.b, $p < 0.5$). Unlike for GD, no significant treatment differences were found for the rate of change in SA. Statistically, this result in not surprising given the lack of interindividual variability for rate of change in SA reported above. Yet, there was some weak evidence for a between-group difference in the pattern of change in SA based on

61

the significant effect of treatment on the quadratic factor (Table 6, model III.b., $p < 0.5$).

As can be seen in Figure 8, in the PT group virtually all change in SA occurred within the first half of treatment, whereas change in the CBT group change was more gradual and evenly distributed across the entire treatment period.

Comorbid Anxiety Disorders as Predictors of Pre-treatment ANH, GD, and SA

Diagnostic status was added as predictor to the basic growth models, I.a, II.a, and III.a, in order to investigate effects of pre-treatment comorbid anxiety on initial status and change trajectories of ANH, GD and SA. The following comorbid diagnostic categories, which included *full* and *subthreshold diagnoses*, were investigated: (1) presence of any comorbid Axis I disorders, (2) presence of any anxiety disorder, (3) OCD, (4) panic disorder (with or without agoraphobia), (5) GAD, (6) social phobia, (7) specific phobia, (8) PTSD, and for comparison (9) any eating disorder. Each of these categories was tested as single predictor of the growth parameters. Otherwise, latent growth models were equivalent to I.b, II.b, and III.b.

A priori hypotheses existed with regard to the effect of pre-treatment diagnostic categories on the intake levels of ANH, GD, and SA; analyses testing potential effects of pre-treatment diagnostic categories on change trajectories were exploratory in nature. In addition to the standard significance criterion of $\alpha = 0.05$ (applied to all analyses), a Bonferroni corrected significance level of $\alpha = 0.05 / 9 = 0.006$ was considered for the test of priori hypotheses in order to adjust for the fact that multiple non-orthogonal tests were performed on the same data. Estimates for the parameters of the fitted growth models examining effects of pre-treatment comorbid diagnoses on the growth trajectories of ANH, GD, and SA and their significance levels are summarized in Table 7.

Table 7

Estimated Standardized Parameters from the Fitted Growth Models examining Pre-treatment Diagnostic Status as Predictor of Change Trajectories (total N = 181 for Each Model)

Estimated effects of pre-treatment comorbid diagnoses on growth trajectories	ANH		GD		SA	
	Parameter	*p*	Parameter	*p*	Parameter	*p*
Any comorbid Axis I diagnosis (n = 112)						
Effect on initial status	-.036	.741	**.255**	*	.055	.619
Effect on rate of change	.007	.944	-.132	.265	-.169	.334
Effect on curvature of change trajectory	-.023	.822	.086	.501	.181	.429
Any Anxiety Diagnosis (n = 88)						
Effect on initial status	-.073	.496	**.381**	***	.179	.103
Effect on rate of change	-.029	.769	-.038	.752	-.093	.594
Effect on curvature of change trajectory	.043	.681	-.008	.952	.098	.662
OCD (n = 5)						
Effect on initial status	.001	.990	**.296**	*	.132	.249
Effect on rate of change	**.204**	*	.084	.514	.286	.136
Effect on curvature of change trajectory	-.163	.115	-.024	.865	-.223	.430
Panic Disorder (n = 16)						
Effect on initial status	-.196	.072	.170	.137	.081	.464
Effect on rate of change	-.161	.108	-.160	.182	-.104	.552
Effect on curvature of change trajectory	.162	.120	.150	.248	.049	.832
GAD (n = 21)						
Effect on initial status	-.011	.922	**.289**	**	**.267**	*
Effect on rate of change	**-.207**	*	**-.268**	*	-.225	.144
Effect on curvature of change trajectory	.203	.050	**.248**	*	.158	.383
Social Phobia (n = 43)						
Effect on initial status	-.002	.986	**.250**	*	.062	.578
Effect on rate of change	.180	.066	**.270**	*	.000	1.000
Effect on curvature of change trajectory	-.176	.087	**-.294**	*	.137	.566
Specific Phobia (n = 28)						
Effect on initial status	.033	.755	**.245**	*	**.326**	**
Effect on rate of change	.076	.444	-.017	.890	-.111	.514
Effect on curvature of change trajectory	-.042	.688	-.014	.913	.103	.636
PTSD (n = 23)						
Effect on initial status	-.108	.304	.095	.421	.115	.301
Effect on rate of change	.085	.387	**.260**	*	.079	.664
Effect on curvature of change trajectory	.015	.887	-.237	.086	-.036	.881
Eating Disorder (n = 22)						
Effect on initial status	.029	.786	-.059	.612	.015	.891
Effect on rate of change	.045	.653	.105	.393	.038	.830
Effect on curvature of change trajectory	-.067	.518	-.139	.301	-.075	.748

Note. Significance levels were derived from the two-tailed Wald test and indicate the likelihood for the parameter to equal zero. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, significant estimates are in **bold**. Of the significant estimates, the only effects reaching significance according the to Bonferroni-corrected significance criterion of $\alpha = 0.006$ were the effect of "Any Comorbid Anxiety Diagnosis" on initial status of GD and "Specific Phobia" on initial status of SA.

None of the diagnostic categories (including all individual anxiety disorders, the presence of any comorbid Axis I disorder, and the presence of any eating disorder) was predictive of pre-treatment levels of ANH (Table 7, $p > 0.304$ for all categories except panic disorder). In fact, the only effect that approached significance was opposite from what might be expected: the presence of comorbid panic disorder was associated with *lower* pre-treatment levels of ANH ($p = 0.072$).

In contrast to ANH, the presence of comorbid anxiety disorders was more consistently associated with a higher pre-treatment level of GD. Using the more lenient criterion of $\alpha = 0.05$, significant predictors included OCD ($p < 0.05$), GAD ($p < 0.01$), social phobia ($p < 0.05$), and specific phobia ($p < 0.05$). Yet, neither panic disorder nor PTSD significantly predicted pre-treatment level of GD ($p = 0.137$ and $p = 0.421$, respectively). In addition, the presence of any anxiety disorder was strongly associated with higher pre-treatment GD ($p < 0.001$). The presence of any comorbid Axis I disorder was also (albeit less strongly) associated with higher pre-treatment levels of GD ($p < 0.05$); comorbid eating disorders were not associated with pre-treatment GD ($p = 0.612$). Higher pre-treatment levels of SA were found in individuals with comorbid GAD ($p < 0.05$) and with comorbid specific phobia ($p < 0.005$) and none of the other diagnostic categories. The only effects reaching the more stringent Bonferroni-corrected criterion of $\alpha = 0.006$ included the effect of the presence of any comorbid anxiety diagnosis on the initial status of GD and the effect of comorbid specific phobia on the initial status of SA.

Growth trajectories of ANH, GD, and SA by pre-treatment diagnostic status are displayed in Figure 9. Post-hoc exploratory analyses of change trajectories suggested that a smaller rate of change in ANH was predicted by only one of the comorbid anxiety disorders, namely OCD ($p < 0.05$). Interestingly, the presence of pre-treatment GAD was

associated with slightly more change in ANH over the course of treatment ($p < 0.05$).

Individuals with comorbid GAD improved faster in the first eight weeks of treatment and

continued to improve at about the same rate as those without comorbid GAD during the

second eight weeks of treatment, leading to differences in patterns of change, which

barely missed significance (p = 0.050).

With regard to GD, differences in change trajectories were predicted by GAD, social

phobia, and PTSD ($p < 0.05$). For GAD and social phobia, differences in curvature of

change trajectories were also found ($p < 0.05$). Pre-treatment diagnoses of social phobia

and of PTSD were associated with less change in GD over the course of treatment.

Furthermore, unlike change trajectories for individuals without social phobia which (on

average) indicated most of the change in GD to occur within the first eight weeks of

treatment, change trajectories for individuals with social phobia were (on average) more

linear. Similarly to ANH, GD actually changed *more* on average for those individuals

who endorsed pre-treatment GAD than for those who did not. However, GD decreased

faster for individuals with comorbid GAD only in the first (and not in the second) half of

the treatment period. Thus, there was a group differences in GD change trajectories, i.e.,

trajectories were more curved for the GAD group ($p < 0.05$). No significant predictors

were identified for pattern of change in SA (effects on slope factor: $p > 0.136$, effect on

quadratic factor: $p > 0.383$, for all diagnostic categories).
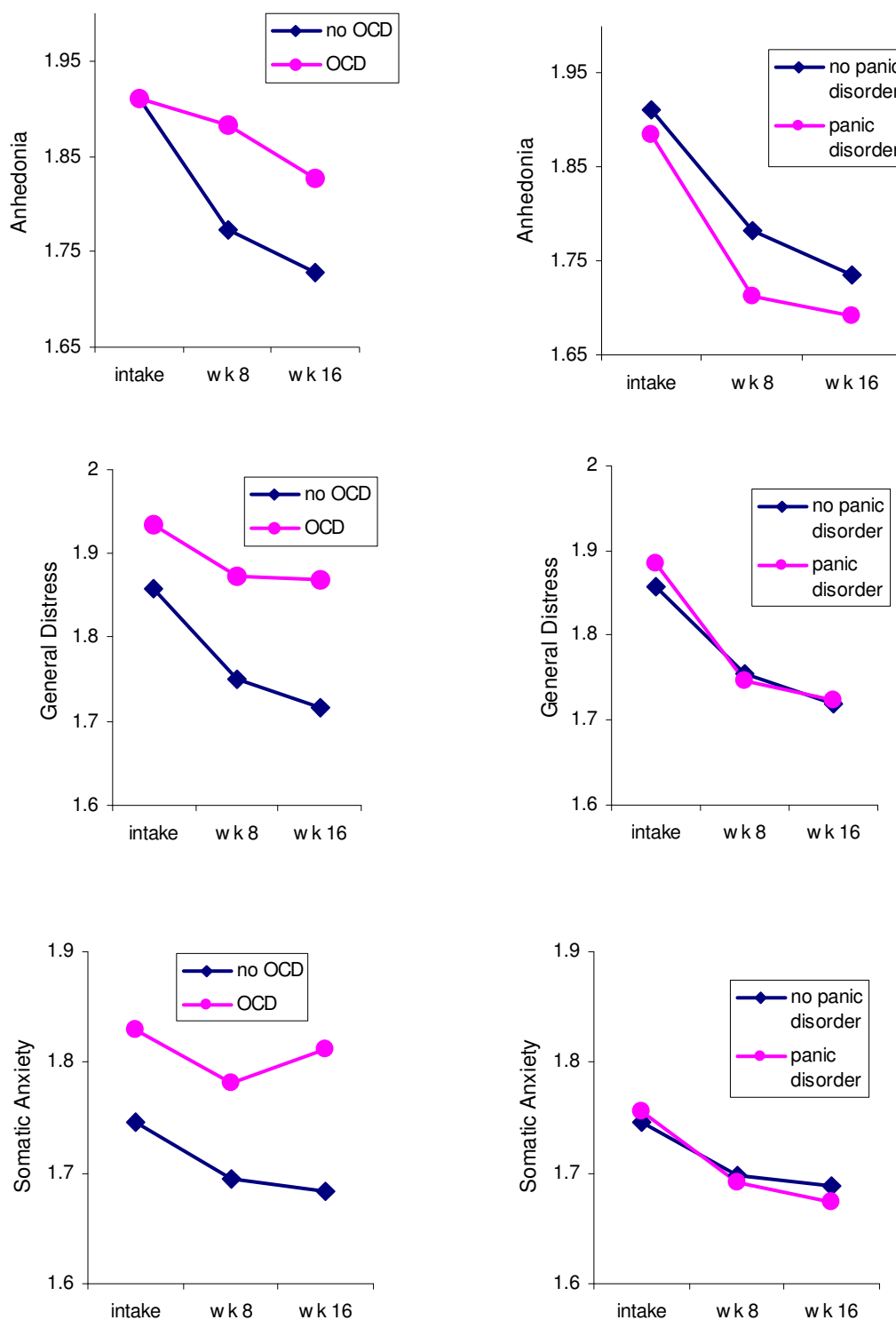
Figure 9. Estimated Average Growth Trajectories of Latent Constructs Anhedonia, General Distress, and Somatic Anxiety Contrasting Groups With versus Without Pre-treatment Comorbid Diagnoses. OCD = comorbid obsessive compulsive disorder, panic disorder = comorbid panic disorder with or without agoraphobia.
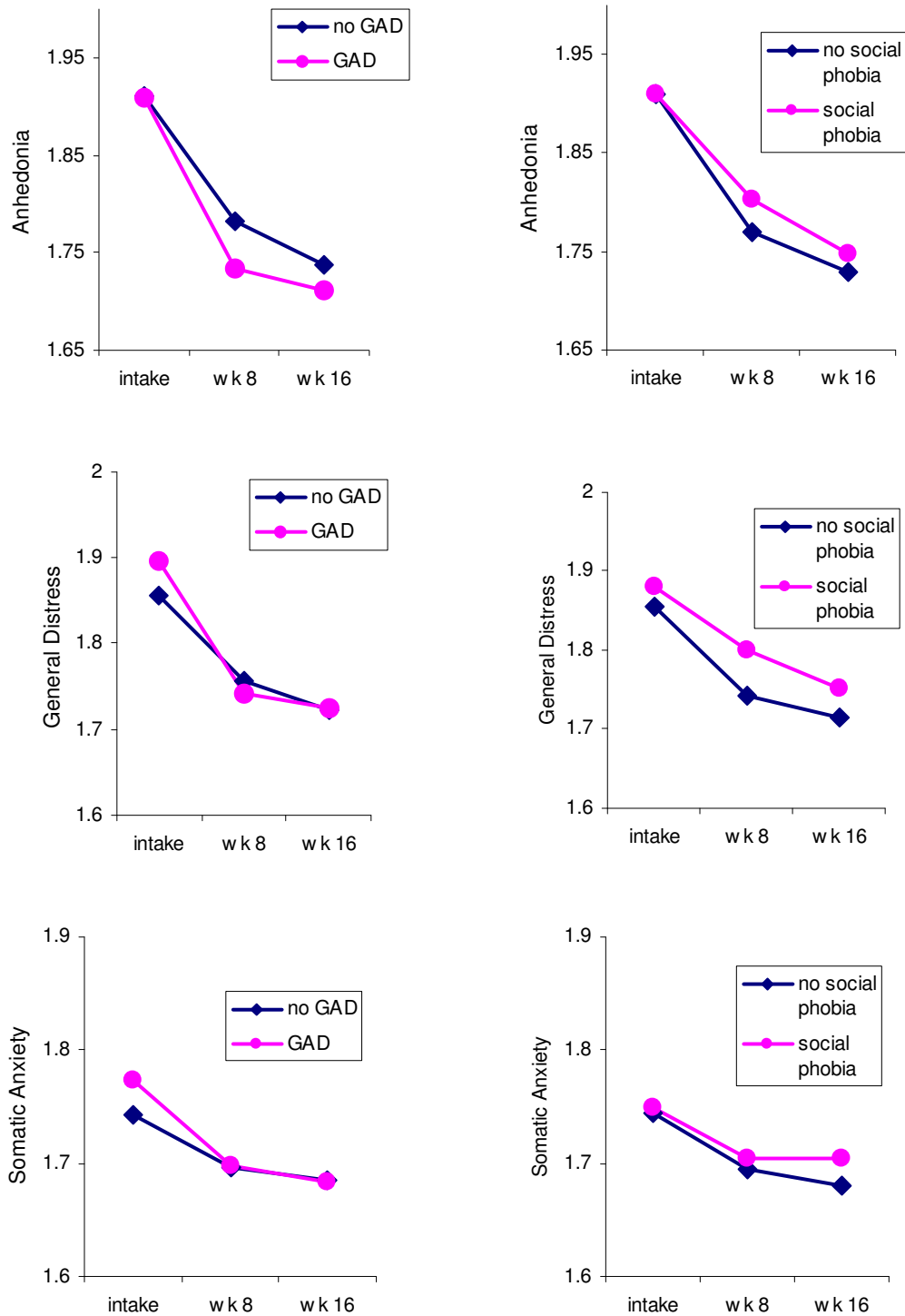
Figure 9, continued. GAD = comorbid generalized anxiety disorder, social phobia = comorbid social phobia.
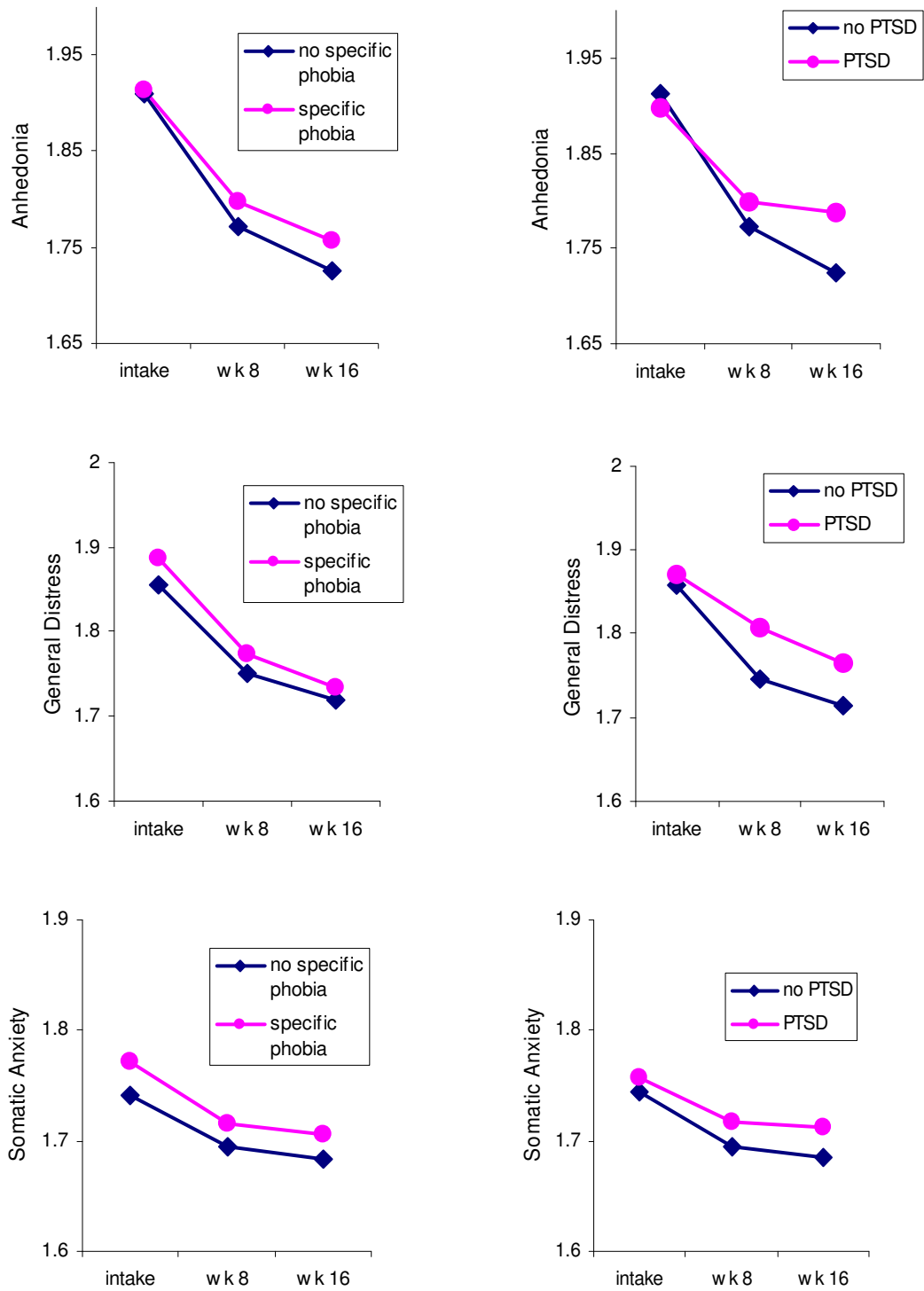
Figure 9, continued. Specific phobia = comorbid specific phobia, PTSD = comorbid post-traumatic stress disorder.

CHAPTER V

DISCUSSION

Summary of Findings

The main aim of this study was to use the tripartite model of anxiety and depression as a theoretical basis for examining change in symptom clusters in a depressed outpatient sample over the course of treatment. Specific goals included (a) the test of a three-factor structure consistent with the tripartite model in the present data set, (b) the investigation of treatment effects (PT versus CBT) on the pattern of change in the three latent constructs, ANH, GD, and SA, over the course of treatment, and (c) an evaluation of pre-treatment comorbid anxiety diagnoses as predictors of initial levels and change in ANH, GD, and SA.

Three – factor structure. As hypothesized in H 1, a three factor-structure consistent with the tripartite model dimensions provided excellent fit for the present data set. Results of the CFA were consistent with previous theoretical and empirical findings providing support for the tripartite model structure (e.g., Clark, Steer, & Beck, 1994; Joiner, 1996; Joiner, Catanzaro, & Laurent, 1996; Watson et al., 1995a, b; 1996). Two plausible alternative models were evaluated, a four-factor structure similar to that proposed by Burns & Eidelson (1998), and a two-factor structure with factors representing Anxiety and Depression, respectively. Neither was found superior to the three-factor model. The four-factor model provided good fit for the data as well, but parameter estimates produced by this model were inconsistent with theoretical assumptions, which made the model difficult to interpret. The two-factor model provided

69

poor fit for the data and proved significantly inferior to the four-factor model, which itself showed a non-significant trend to be inferior to the three-factor model. A reduced three-factor model with a narrower and temporally more stable GD factor also provided an excellent fit for the data. Yet, as mentioned earlier, many other theoretical models may be plausible and provide good fit for the data as well.

Both three-factor models indicated highly significant positive correlations among the latent constructs, which were slightly smaller in the reduced model. Correlations between GD and SA (.71 in both cases) were similar to those reported in previous studies (ranging from .50 to .71) involving non-clinical (e.g., Joiner, 1996; Watson at al., 1995b) and patient populations (e.g., Brown et al., 1998; Joiner et al., 1999; Lambert et al., 2004; Watson at al., 1995b). Present correlations between ANH and GD (.68 and .78) and between ANH and SA (.58 and .61) fell in the high range of previous reports for correlations between ANH and GD (ranging from .49 to .84) and between ANH and SA (.23 to .72) involving non-clinical (e.g., Joiner, 1996; Lambert et al., 2004; Watson, et al., 1995b) and clinical populations (e.g., Brown et al., 1998; Burns & Eidelson, 1998; Lambert et al., 2004; Watson, et al., 1995b). Based to previous studies, correlations between factors representing the tripartite components appear to be higher in clinical as opposed to non-clinical populations. The present study involved a more severely depressed sample than most previous studies on this subject. All participants met criteria for major depressive disorder with fairly severe and chronic symptoms. Even though the confirmatory factor analysis was based on post-treatment data of the current sample, residual levels of psychopathology were still present. One possible interpretation of the results is that symptom clusters are more linked in this population even after treatment. However, other factors which may have contributed to discrepancies among studies may

include the selection of manifest variables (availability of measures and selection of items) and differences in data analytic techniques (e.g., the present model did not allow for cross-loadings).

Tests of construct invariance revealed that ANH, GD, and SA were sufficiently stable across time when tested separately in each treatment group. ANH, and SA were also sufficiently stable across treatment groups, whereas GD was not stable across treatment groups. Variability in the measurement of GD, statistically manifested in the somewhat different patterns of factor loadings across time and groups, suggests that GD may represent slightly different theoretical constructs in the two treatment groups at one or more time points. Although these findings may be a statistical artifact of uneven and relatively small sample sizes or other causes, caution for the interpretation of growth curve modeling, especially with regard the effects of predictors, is warranted.

Treatment differences in change curves of ANH, GD, and SA. Consistent with H 2, both treatments led to significant improvement in ANH, GD, and SA suggesting that both PT and CBT had benefit for all three symptom clusters. Given that the present analyses did not include the placebo condition, significant changes with treatment (i.e. slopes of trajectories significantly different from zero) or differences between PT and CBT do not by themselves imply the superiority of either treatment to placebo. For present purposes of investigating differential effects of PT and CBT on symptom change, a comparison to placebo is not required. Yet, it may be of interest in this context, that previous analyses on the present data have shown both PT and CBT to be superior to placebo treatment with regard to using the 17-item version of the HRSD (DeRubeis et al., 2005). Given that the currently investigated symptom dimensions are in part based on symptoms of the

71

HRSD, there is reason to speculate (yet not assume) that this superiority of both PT and CBT over placebo would hold for one or more of the symptom dimensions.

With regard to treatment differences, GD was found to improve significantly faster and at a higher rate with PT than with CBT, which is consistent with H 3. On a cautionary note, the fact that GD was not invariant across groups makes an interpretation of these findings more difficult as a less than ideal model fit may have biased parameter estimates including treatment effect. Specifically, this may have increased the probability of discovering statistically significant treatment effects. Yet, given the highly significant finding of group differences, there is reason to belief that this was, at least in part, due to an advantage of PT over CBT with regard to improving GD.

In general, this finding is consistent with previous reports of serotonergic agents to be particularly effective in treating symptoms of general distress and anxiety (Bodkin et al., 1997; Knutson et al., 1998; Shelton and Tomarken, 2001). Indeed, our results suggest that in a severely depressed population, the SSRI paroxetine may improve GD more rapidly than CBT. With PT, most change in GD occurred (on average) within the first eight weeks of treatment, whereas GD (on average) continued to decrease at a fairly steady rate with CBT over the entire 16 weeks of treatment. With regard to PT, these findings are consistent with previous reports of SSRIs most potently affecting GD symptoms within the first six weeks of treatment (e.g., Boyer et al., 2000; Knutson et al., 1998; Ravindran et al., 1997; Sheehan et al., 1992; Lammers, Diaz, Schwartz & Sokoloff, 2000).

On the other hand, results do not suggest the same advantage for PT compared to CBT in the treatment of symptoms consistent with ANH, which provides support for the distinctiveness of the constructs GD and ANH. No statistically significant between-

group differences were found in change of ANH with regard to either rate or pattern of change. Unfortunately, this null finding does not provide strong support for either H 4a or H 4b and is open to a large number of possible interpretations. Clearly, a relation between ANH and GD is fairly well established based on consistently high correlations reported in the literature (as mentioned above) and has been found in the present data as evidenced by the moderately high correlations between the latent constructs of ANH and GD. Also, the finding that both symptom clusters improved at fairly similar rates provides support for the effectiveness of PT and CBT in the treatment of *both* GD and ANH. There was a non-significant trend for ANH to improve at a greater rate with PT than with CBT, which suggests some support for H 4b proposing equivalent patterns of change for GD and ANH. However, the finding that the treatment effect on rate and pattern of change in ANH was far less pronounced than in GD and did not reach significance, also provides some support for H 4a, which proposed that PT would not be superior to CBT in the treatment of ANH. This differential pattern of treatment effects on ANH as opposed to GD provides some support for the distinctiveness of these symptom dimensions and their differential response to treatment.

Given that differential change curves between constructs was not contrasted statistically in the present analyses, it cannot be determined from the present data, whether the lack of treatment group differences in the treatment of ANH is mostly related to (a) the relatively lower effectiveness of paroxetine with regard to ANH, (b) the emphasis on behavioral activation in the early sessions of CBT, or (c) both, cannot be decided in the present study. Interpretation (a) would be consistent with previous reports of the lower and/or slower effectiveness of SSRI's found in the treatment on ANH symptoms (e.g., Bodkin et al., 1997; Boyer et al., 2000) rather than studies which failed

to find differential treatment effects (e.g., Dichter et al., 2005). Clearly, more research is

needed to identify the various factors contributing to effectiveness, as well as the lack

thereof, in the treatment of ANH.

The pattern of improvement in SA, expected to closely follow the pattern of GD (H

5), was only partly congruent with expectations. Similarly to GD, most change in SA

occurred within the first eight weeks of treatment in the PT condition, whereas change

occurred more gradually with CBT. Contrary to H 5, however, the average rate of

change across the entire course of treatment (slope of trajectory) did not differ for the two

treatment groups. Also unexpectedly (and likely due to chance), individuals in the CBT

condition started out with significantly higher levels of SA than individuals in the PT

condition. Although findings might provide some support for the distinctiveness of GD

and SA as they seem to differ with regard to treatment effects, it is likely that individuals

reached a "floor" with regard to improvement in SA at week 16. In fact, in PT this floor

may have been reached already at week 8. This latter speculation finds support by the

findings of relatively small, but highly variable, initial levels of SA together with a

decrease in variability in this construct over time.

***The effect of comorbid anxiety disorders at intake on the change curves of ANH,
GD, and SA over the course of treatment.*** Consistent with the tripartite model and the

expectation expressed in H 6, none of the comorbid anxiety disorders at intake was

associated with a difference in pre-treatment levels in ANH. In contrast to ANH and

largely consistent with H 7, most pre-treatment comorbid anxiety disorder diagnoses,

namely OCD, GAD, social phobia, and specific phobia, predicted a higher pre-treatment

levels of GD. Interestingly, panic disorder and PTSD were exceptions to this finding.

The presence of any anxiety disorder diagnosis was strongly associated with higher pre-

treatment levels of GD. With the more stringent Bonferroni-corrected criterion for

significance, the presence of any anxiety disorder diagnosis (yet none of the individual

diagnostic categories) predicted higher pre-treatment GD. In comparison, the presence of

pre-treatment eating disorders was not associated with elevated levels of GD. Taken

together, these findings are consistent with previous findings of GD being shared by both

depression and anxiety disorders, and ANH being specific to depression (e.g., Brown et

al., 1998; Chorpita, 2002; Watson et al., 1988), and provide at least some support for an

additive quality of GD in comorbid conditions which are both individually associated

with GD.

Contrary to prediction H 8, comorbid panic disorder neither predicted higher levels of

pre-treatment SA nor change in SA with treatment. Instead, pre-treatment comorbid

GAD and specific phobia were the only diagnostic categories found to predict higher

levels of SA at intake; only the effect for specific phobia reached significance after

Bonferroni-correction. Although the tripartite model does not make direct predictions for

comorbid conditions, the present findings are considered to be rather inconsistent with

the theory of the tripartite model, which stipulates SA to be the unique component of

anxiety (as compared to depression). Based on the model, higher levels of SA would be

expected to be present before treatment in individuals with comorbid anxiety conditions.

In addition, the lack of association of panic disorder with SA is also not consistent

with previous studies, which found SA to be positively correlated with panic disorder

(Brown et al., 1998; Chorpita. 2002). One plausible explanation of the discrepancy

between the theoretical foundation of the tripartite model and empirical findings, which

frequently fail to identify a relation between SA and most anxiety disorders may be that

SA is present and/or reported only when individuals are confronted with anxiety-

provoking stimuli. Thus, when avoided successfully, SA may not differ significantly between individuals with and without a specific anxiety disorder. It remains open for speculation, however, why significant pre-treatment elevations in SA were found in individuals with comorbid GAD and specific phobia.

As predicted in H 9, the presence of any pre-treatment comorbid Axis I diagnosis was also associated with higher pre-treatment GD (albeit less strongly than the presence of comorbid anxiety diagnosis and not significant after Bonferroni correction), yet was not associated with pre-treatment ANH or SA. This provides some support for the idea that GD may be common in psychopathology other than depression and anxiety disorders as well (Shelton & Tomarken, 2001).

Remarkably, exploratory analyses (using the more lenient criterion of alpha = .05) revealed that diagnostic group differentially predicted change in the symptom dimensions. Different comorbid diagnostic conditions emerged as predictors of change in GD versus ANH and none of the diagnostic categories was associated with change in SA. Pre-treatment comorbid social phobia and PTSD were both associated with smaller rates of change in GD. For individuals with comorbid social phobia, the disadvantage was more pronounced in the first eight weeks of treatment. These findings suggest that social phobia and PTSD are negative predictors of change in GD regardless of initial levels. In addition, the presence of pre-treatment comorbid OCD predicted less improvement in ANH over the course of treatment. The presence of comorbid OCD at intake can therefore be viewed as negative predictor of change in ANH. Although the simultaneous prediction of growth by both pre-treatment diagnostic status and treatment group was not pursued in the present study, it is likely that the effects of comorbid conditions on change in symptom dimensions differed for the two treatment groups.

76

Curiously, GAD emerged as a positive predictor of change in both GD and ANH. The presence of pre-treatment GAD, though expectedly associated with higher levels of GD at intake, was also associated with more and more rapid reduction in GD. Pre-treatment GAD very similarly predicted more change in ANH, though the effects were less pronounced (in fact, the effect on curvature missed significance at $p = 0.050$). Visual inspection of change curves revealed that comorbid GAD was a positive predictor of change in GD and ANH only in the PT condition and not in the CBT condition. As GD may play a particularly central role in patients reporting both depression and GAD symptoms (Zinbarg et al., 1994), this finding might be seen as yet another instantiation of the efficiency of PT in reducing GD symptoms. The relative greater reduction in ANH for this comorbid group was more surprising and may argue for the link between GD and ANH.

In sum, most pre-treatment comorbid anxiety disorders predicted higher levels of GD at intake, yet none of the pre-treatment comorbid anxiety disorders predicted pre-treatment ANH, and only GAD and specific phobia predicted higher levels of SA at intake. Findings are largely consistent with the tripartite model in that comorbid anxiety disorders were associated with increased GD, yet not ANH. On the other hand, in this severely depressed sample, comorbid anxiety disorders were not consistently found to be associated with SA. If replicated, the discovery of comorbid conditions as negative (or positive) predictors of change in specific symptom clusters has important relevance for treatment planning.

Limitations and Future Directions

There were several limitations which restrict the generalizability of the findings.

First, depression in the present sample was fairly severe, either highly recurrent or chronic, and started for many participants before adulthood. These characteristics may have decreased the likelihood of detecting certain effects such as differences between diagnostic groups with regard symptom dimensions (both, initial levels and change trajectories). The main reason for this is restricted variability of symptom levels compared to less depressed populations. Specifically, when GD and ANH are high throughout the entire sample, comorbid conditions can only add relatively little to these dimensions before reaching a "ceiling". For this reason, differences between comorbid diagnostic categories with regard to these symptom dimensions might be more pronounced in a less severely depressed population.

Second, given the requirement of relatively large sample sizes for second-order LGM (e.g., Muthén & Curran, 1997; MacCallum, Browne, & Sugawara, 1996), it is possible that the (uneven) sample sizes of 62 (CBT) and 119 (PT) did not provide enough power for certain parameter estimates to reach significance and contributed to the instability of the construct GD across groups. Also, despite the high rate of comorbid anxiety disorders (48.6%), the prevalence of individual anxiety disorders was still relatively small. For this reason, subthreshold levels of comorbid conditions were included, which could have diminished group effects. Even after this inclusion, the number of individuals with comorbid OCD was small (n = 5), which on the one hand leaves little power to detect small effects, and on the other hand lead to effects which are not generalizable. Nonetheless, the differential effects of pre-treatment diagnostic status on initial levels of and change in the different symptom clusters were encouraging and should be replicated in broader samples including less depressed individuals.

Third, the assessment of the latent constructs was limited by a number of factors. An attempt was made to match measurement methods across constructs, but due to availability of items, this was not entirely possible. For example, a larger number of items across a larger variety of measures were available to assess the construct GD than were available for the assessment of the constructs ANH and SA. The relative lack of items representing ANH was indicative of a more general under-representation of items representing ANH as compared to GD in depression measures, discussed earlier. Also, only three time points were used for the current analyses. They were chosen because all measures of interest were administered at these time points. Clearly, the optimal frequency of symptom assessments is itself subject to investigation. However, more frequent assessment would allow for more precise modeling of growth trajectories. In addition to weekly average ratings, range and variability of ANH, GD, and SA across time may contain valuable information and should be explored in future studies as well. With regard to SA, the range and frequency of high SA periods (in addition to the assessment of weekly averages) may capture additional aspects of treatment effects.

Fourth, even though all participants in the PT condition received paroxetine as their primary medication during the first eight weeks of treatment, there was flexibility with regard to augmentation strategies after this period. Therefore, findings regarding the second half of treatment cannot be solely related to the effects of paroxetine. Interestingly, however, significant treatment effects (i.e., more improvement in GD and more curvilinear change trajectories in both GD and SA) were due to the relative advantage of PT over CBT within the first eight weeks of treatment making the implication of paroxetine in these effects rather likely.

Fifth, in the present study the constructs ANH, GD, and SA were modeled separately

and change trajectories in the three symptom dimensions were not compared statistically. It would be extremely useful to directly compare the rate of change in two (or all three) symptom dimensions as a function of treatment condition. LGM provides a particularly helpful tool to model change in different constructs simultaneously (i.e. multivariate) across time. This type of analysis can help address questions such as whether (a) one or both treatment(s) affected one symptom dimension more than another and (b) whether change in one symptom dimension preceded or even mediated change in another symptom dimension.

Finally, present analyses do not provide any insight into mechanisms underlying the differential treatment effects. Interindividual differences in symptom change trajectories may have been mediated by any number of factors. It is impossible to discern the various variables in the pharmacological and the cognitive-behavioral treatment which facilitated (or hindered) symptoms reduction. The use of dual differentiation desings, i.e. contrasting two treatments known to involve different mechanisms and hypothesized to show opposite patterns in the reduction of symptom groups (e.g., Dichter et al., 2005) is particularly valuable in this context and should also be applied to psychotherapy research. For instance, treatment modalities and techniques should be compared with regard to differential effects on these symptom dimensions.

Conclusion

The CPT II data set provided a unique opportunity to test the tripartite model structure in the treatment of depression. The tripartite model of anxiety and depression (Watson & Clark, 1991), particularly the distinction between symptoms of NA/GD versus symptoms of low PA/ANH, has found support from several different research

areas. Although there have been a growing number of empirical studies examining the validity of the tripartite model regarding the structure of anxiety and depression symptoms, to the knowledge of the author, this is the first study to use this model as a heuristic to compare the efficacy of PT versus CBT in the treatment of depression. The present study was aimed at investigating differential treatment effects of PT versus CBT on the change trajectories of the three dimensions, GD, ANH, and SA. The SSRI paroxetine was found to have relative advantage over CBT in the early treatment of GD symptoms, but not in the treatment of ANH symptoms. Also, a differential treatment effect on the pattern of change in SA was found reflecting the fact that almost all change with PT occurred within the first eight weeks of treatment, while change with CBT occurred more gradually over the entire sixteen weeks of therapy. Further, even in this fairly severe sample, the presence of any comorbid Axis I condition, but comorbid anxiety disorders in particular, was associated with higher levels of GD (and to a lesser degree SA), but not ANH.

In sum, results provide further support for the distinctiveness of the investigated symptom clusters and therefore for the validity of the tripartite model. Findings also argue for the potential usefulness of the tripartite model as a heuristic for the selection of treatment strategies and for the development of treatment for depression in general. Further research should focus on differential mechanisms by which PT and CBT effect change in these symptom dimensions.

APPENDIX A

HAMILTON RATING SCALE FOR DEPRESSION (HRSD)

OVERVIEW*:* I'd like to ask you some questions about the past week.

1. DEPRESSED MOOD

DEPRESSED MOOD (sad, hopeless, helpless, worthless)

What's your mood been like this past week?

(0) absent

Have you been feeling down or depressed?

(1) mild: these feeling states indicated only on questioning <u>and</u> are not the predominant mood state; feels depressed no more than two days <u>or</u> only intermittently

Sad? Hopeless? Numb?

(2) moderate: these feeling states spontaneously reported; feels depressed more days than not (i.e., the predominant mood state)

Have you been crying at all?

(3) marked: communicated feeling states non-verbally, i.e., facial expression, posture, voice tendency to weep; some functional impairment

In the last week, how often have you felt this way (PATIENT'S OWN EQUIVALENT)? Every day? All day?

(4) severe: patient reports VIRTUALLY ONLY these feeling states in his spontaneous verbal and non-verbal communication; severe functional impairment

2. FEELINGS OF GUILT

Have you been especially critical of yourself this past week, feeling you've done things wrong, or let others
down? IF YES: What have your thoughts been?

FEELINGS OF GUILT:

(0) absent

Have you been feeling guilty about anything that you've done or not done?

(1) self-reproach (whether or not there has been wrongdoing), feels she/he has let people down

Have you thought that you've brought your troubles on yourself in some way?

(2) ideas of guilt spontaneously expressed

How often have you had these thoughts? Do these thoughts ever repeat themselves? How much have they bothered you? Are these thoughts uncontrollable?

(3) Present illness is a punishment; or repeated intrusive guilty thoughts (i.e., ruminations) over past errors or sinful deeds

--Do you think you're being punished for something you did?
-- Do these thoughts ever sound like they come from the outside, like hearing someone else's voice? If so, whose voice is it?

(4) hears accusatory or denunciatory voices and/or experiences threatening visual hallucinations; delusions of guilt

3. SUICIDE

This past week, have you had any thoughts that life is not worth living, or that you'd be better off dead? What about having thoughts of hurting or even killing yourself?
IF YES: What have you thought about?
Have you actually done anything to hurt yourself?

SUICIDE:

(0)   absent
(1)   feels life is not worth living
(2)   wishes she/he were dead or thoughts of possible death to self (other than suicidal)
(3)   suicidal ideas or specific suicide plan
(4)   attempts at suicide

SUM OF ITEMS 1, 2, AND 3: _____

"Typical" Sleep Items

4. INSOMNIA EARLY

How have you been sleeping over the last week?
How many hours have you been getting?
Have you had any trouble falling asleep at the beginning of the night?
(Right after you go to bed, how long has it been taking you to fall asleep?)

How many nights this week have you had trouble falling asleep?

INSOMNIA EARLY:

(0)   no difficulty falling asleep

(1)   mild and/or infrequent: less than 30 minutes most nights, or if longer no more than twice during the past week
(2)   definite and severe, more than 30 minutes on most nights

5. INSOMNIA MIDDLE

During the past week, have you been waking up in the middle of the night?
IF YES: how many nights? How often do you awaken?
Do you get out of bed? What do you do? (Only to go to the bathroom?)
When you get back in bed, are you able to fall right back asleep?
Have you felt your sleeping has been restless or disturbed some nights?

INSOMNIA MIDDLE:

(0)   no difficulty

(1)   mild and/or infrequent: complains of being restless and disturbed some nights
(2)   definite and severe: waking most every night (except for purposes of voiding); difficulty getting back to sleep (i.e., more than 30 minutes most nights) or multiple brief awakenings each night

6. INSOMNIA LATE

What time have you been waking up in the morning for the last time, this past week?

Is this earlier than you would like?

IF EARLY: Is that with an alarm clock, or do you just wake up by yourself?

INSOMNIA LATE:

(0)   no difficulty

(1)   mild and/or infrequent: wakes earlier than usual some mornings (i.e., 30 minutes earlier than desired) or infrequently (i.e., 1 or 2 mornings)

(2)   definite and severe: wakes 1-3 hours before usual time and is unable to sleep again

Sum of items 4, 5, and 6: _____

Atypical Sleep Items

4A. HYPERSOMNIA (Retires earlier and/or rises later)

When do you go to bed?

HYPERSOMNIA (Retires earlier and/or rises later than usual. This does not necessarily mean that the patient sleeps longer, just spends more time in bed.)

Is this earlier than usual (when not depressed) for you?

IF YES: How much earlier? (Weekends?)

When do you get up?

Is this later when not depressed? (Weekends?)

(0)   absent

(1)   mild; less than 60 minutes

(2)   obvious and definite; goes to bed more than 60 minutes earlier on most nights

5A. HYPERSOMNIA (Oversleeping, sleeping more than usual)

Compare sleep length to euthymic and not to hypomanic sleep length.

If this cannot be established, use 8 hours.

Oversleeping - Have you been sleeping more than usual this past week?

IF YES: How much more?

IF NO: What about weekends?

HYPERSOMNIA (Oversleeping, sleeping more than usual)

(0)   absent

(1)   mild or infrequent: Oversleeps less than 60 minutes

(2)   obvious and definite: Oversleeps more than 60 minutes most days

Sleep length used: (Circle one)

euthymic   8 hours

APPENDIX A, continued

6A. HYPERSOMNIA (Napping - excessive daytime sleepiness)

Do you take naps?

IF YES: When? How often? How long?

IF NO: How about weekends?

HYPERSOMNIA (Napping. Excessive daytime sleepiness.)
(0)   absent

(1)   mild or infrequent: naps less than 30 minutes
(2)   obvious and definite: sleeps more than 30 minutes most days during naps

Sum of items 4A, 5A, and 6A: _____

SLEEP DISRUPTION TOTAL SCORE: _____
(Enter the sum of items 4, 5, and 6;
OR the sum of items 4A, 5A, and 6A, whichever is greater)

7. WORK AND ACTIVITIES

How have you been spending your time this past week (when not at work)?

Do you have your normal interest in doing (THOSE THINGS), or do you feel you have to push yourself to do them?

Are you less interested in things like your job, spending time with family, friends or hobbies?

Have you decreased or even stopped doing anything?

IF WORKING: Do you feel you are less efficient or effective at work?
Have you been able to have any fun? How has your ability to feel enjoyment or pleasure been?

WORK AND ACTIVITIES:

(0)   no difficulty

(1)   thoughts and feelings of incapacity, or disinterest related to activities, work or hobbies; mild and/or intermittent
(2)   decreased interest in activity, hobbies or work most days - either directly reported by the patient or indirect in listlessness, indecision and vacillation (feels he/she has to push self to work or engage in activities)
(3)   definite decrease in actual time spent in activities or decreased productivity due to depression
(4)   Complete loss of interest. Anhedonia. Stopped working or engaging in routine activities because of depression

8. RETARDATION
RATING BASED ON OBSERVATION DURING INTERVIEW

RETARDATION (slowness of thought and speech; impaired ability to concentrate; decreased spontaneous motor activity; postural change - slumped, stooped):

(0)   normal speech and thought
(1)   mild: slight flattening of affect, fixity of expression, or minimal slowing of speech and/or spontaneous movements
(2)   moderate: monotonous voice, delayed in answering questions, tends to sit motionless
(3)   severe: retardation prolongs interview to a marked degree, slowness of movement and gait with diminished associated movement
(4)   extreme: depressive stupor, interview impossible

9. AGITATION
RATING BASED ON OBSERVATION DURING INTERVIEW

AGITATION (restlessness, repetitive "nervous" mannerisms, frequent posture changes, difficulty sitting still):

(0)   none
(1)   mild: fidgety at interview, clenching fists or side of chair, kicking feet
(2)   moderate: wringing hands, biting lips, pulling hair, gesturing with arms, picking at hands and clothes
(3)   severe: includes features of (2). In addition, cannot stay in chair during interview
(4)   extreme: hand-wringing, nail biting, hair-pulling, biting of lips, almost continual pacing. Patient looks bewildered and distraught.

SUM OF ITEMS 7, 8, AND 9: _____

10. ANXIETY PSYCHIC

Have you been feeling especially anxious, nervous, tense or irritable, frightened and/or apprehensive this past week?

Have you had a hard time relaxing this past week?

Have you been worrying a lot about little unimportant things, things you wouldn't ordinarily worry about?
IF YES: Like what, for example?

ANXIETY PSYCHIC:

(0)   no difficulty
(1)   mild, i.e., intermittent tension or irritability
(2)   moderate: worried, tense, anxious or nervous more often than not; not incapacitated
(3)   severe: psychic anxiety symptoms most of the time; anxiety is the predominant mood state, incapacitated by psychic anxiety symptoms
(4)   fears expressed without questioning

11. ANXIETY SOMATIC

In this past week, have you had any of these physical symptoms? READ EACH LIST TO THE RIGHT, PAUSING AFTER EACH THREE FOR REPLY

How much have these things been bothering you this past week? (How bad have they gotten? How much of the time, or how often, have you had them?)

DO NOT RATE IF SYMPTOMS ARE ABSOLUTELY AND UNEQUIVOCALLY RELATED TO A TRANSIENT MEDICAL PHENOMENON (I.E., MENSTRUATION, AN INFECTION, OR ACUTE COCAINE INTOXICATION)

ANXIETY SOMATIC – physiologic concomitants of anxiety, such as:
dry mouth, gas, indigestion;
diarrhea, cramps, belching; nausea, constipation;
heart palpitations, headaches, dizziness;
hyperventilating, sighing;
having to urinate frequently, sweating, trouble swallowing
(0)   absent

(1)   doubtful or infrequent
(2)   mild: reports at least several symptoms, which are not marked or incapacitating
(3)   moderate: greater number and frequency of symptoms than (2). Accompanied by more severe subjective distress with some impairment of normal functioning
(4)   severe: symptoms are numerous, persistent and incapacitating much of the time

12. APPETITE DECREASE

How has your appetite been this past week?

(What about compared to your usual appetite?)

Have you had to force yourself to eat?

Have other people had to urge you to eat?

DECREASED APPETITE:

(0)   none

(1)   decreased appetite but eating without encouragement
(2)   definite decrease; difficulty eating without urging

12A. APPETITE INCREASE

Are you definitely eating more than usual?

Have you noticed cravings for specific foods, such as sweets or chocolates?

INCREASED APPETITE (Change in appetite marked by increased food intake)

(0)   absent

(1)   mild: minimal or slight increase in appetite; food craving

(2)   obvious: definite and marked increase in food intake

APPETITE DISTURBANCE SCORE: _____
(Enter the score for 12 OR 12A, whichever is greater)

SUM OF ITEMS 10 AND 11, PLUS APPETITE DISTURBANCE SCORE: _____

13. ENERGY

How has your energy been this past week?

Do you tire more easily than usual? If yes how much of the time?
Have you felt fatigued?

Do you feel heaviness in your limbs or other parts of your body? How often do you feel this way? How much has it affected you?

ENERGY:

(0)   none

(1)   mild, intermittent, infrequent. Loss of energy, and fatigue

(2)   definitely present most every day; subjectively experienced as severe

14. LIBIDO

How has your interest in sex been this week? (I'm not asking you about performance, but about your interest in sex - how much you think about it.)
Has there been any change in your interest in sex (from when you were not depressed?)
Is it something you've thought much about?

SEXUAL SYMPTOMS (such as loss of libido):
(0)   absent

(1)   mild: some decrease in libido, although not complete or persistent

(2)   severe: complete absence/loss of sexual desire

15. HYPOCHONDRIASIS

In the last week, how much have your thoughts been focused on your physical health or how your body is working (compared to your normal thinking)?
Do you complain much about how you feel physically?
Have you found yourself asking for help with things you could really do your self?

IF YES: Like what, for example? How often has that happened?

HYPOCHONDRIASIS:

(0)   absent
(1)   mild: some preoccupation with bodily functions and physical symptoms
(2)   moderate: much attention given to physical symptoms. Patient expresses thoughts of organic disease with a tendency to somaticize.
(3)   severe: convictions of organic disease to explain present condition, e.g. brain tumor
(4)   extreme: hypochondriacal delusions often with guilty association, e.g. rotting inside

16. LOSS OF WEIGHT

Have you lost any weight since this (DEPRESSION) began? IF YES: How much?

LOSS OF WEIGHT:

(0)   no weight loss or weight loss associated with dieting

IF NOT SURE: Do you think your clothes are any looser on you?

(1)   probable weight loss associated with present illness

(2)   efinite (according to patient) weight loss, at least 5 lbs. (2.2 kg) during the episode

16A. WEIGHT GAIN

Have you gained any weight since this (DEPRESSION) began? IF YES: How much?

WEIGHT GAIN:

(0)   no weight gain

IF NOT SURE: Do you think your clothes are any tighter on you?

(1)   probable weight gain associated with present illness

(2)   definite (according to patient) weight gain, at least 5 lbs. (2.2 kg) during the episode

WEIGHT CHANGE SCORE: _____
(Enter the score for 16 OR 16A, whichever is greater)

SUM OF ITEMS 13, 14, AND 15, PLUS WEIGHT CHANGE SCORE: _____

17. INSIGHT
RATING BASED ON OBSERVATION

INSIGHT:

Optional probe: What do you think the source of your current problem is?

(0)   acknowledges being depressed and ill OR, if appropriate, not currently depressed

(1)   acknowledges illness but attributes cause to bad
food, climate, overwork, virus, need for rest, etc.

(2)   denies being ill at all; despite having definite symptoms

TOTAL 17-ITEM ADJUSTED HAMILTON DEPRESSION SCORE:
_____
(Add the totals at the *bottom* of pages 1, 3, 4, 5, 6, *and 7 above*)

18. DIURNAL VARIATION

This past week have you been feeling better or worse at any particular time of day - morning or evening?

IF VARIATION: How much worse do you feel in the (MORNING OR EVENING)?

How many days have you noticed a difference?

IF UNSURE: A little bit worse or a lot worse?

DIURNAL VARIATION:
When present, mark the severity and frequency of the mood variation (if NO diurnal variation, mark NONE):

(0)   no variation OR currently not depressed

(1)   mild variation

(2)   severe variation

NOTE WHETHER SYMPTOMS ARE WORSE IN THE MORNING OR EVENING:

_____ worse in the A.M.

_____ worse in the P.M.

19. DEPERSONALIZATION AND DEREALIZATION

In the past week, have you ever suddenly had the feeling that everything is unreal, or you're in a dream

or cut off from other people in some strange way? Any spacey feelings?

IF YES: How bad has that been? How often this week has that happened?

DEPERSONALIZATION AND DEREALIZATION (such as feelings of unreality and nihilistic ideas):

(0)   absent

(1)   mild

(2)   moderate

(3)   severe

(4)   incapacitating

20. PARANOID SYMPTOMS

This past week, have you felt that anyone was trying to give you a hard time or hurt you?

IF NO: What about talking about you behind your back?

IF YES: Tell me about that.

PARANOID SYMPTOMS:

(0)   none

(1)   mildly suspicious

(2)   more persistent and/or frequent ideas of reference

(3)   delusions of reference and persecution

21. OBSESSIONAL AND COMPULSIVE SYMPTOMS

In the past week, have there been things you've had to do over and over again, like checking the locks on the doors several times, or washing your hands over and over?

IF YES: Can you give me an example?

Have you had any thoughts that don't make any sense to you, but that keep running over and over in your mind? IF YES: Can you give me an example?

OBSESSIONAL AND COMPULSIVE SYMPTOMS:

(0)   absent

(1)   mild or intermittent symptoms

(2)   severe and/or incapacitating symptoms

22. HELPLESSNESS

Have you had any helpless feelings in the past week?

Do you feel able or capable to solve your problems?

Have you needed someone to guide or reassure you to get things done?

IF SO: Has someone had to actually help you get things done?

HELPLESSNESS:

(0)   absent

(1)   mild or intermittent; subjective feelings elicited only by inquiry

(2)   moderate: patient volunteers his/her helpless feelings

(3)   severe: REQUIRES urging, guidance and reassurance to accomplish regular chores or personal hygiene

(4)   incapacitating: REQUIRES physical assistance for dress, grooming, eating, bedside tasks, personal hygiene

23. HOPELESSNESS

In the last week have you felt discouraged or pessimistic about the future?
Do you ever doubt that things will improve?

IF YES: How much of the time is this a problem?
Do others try to encourage you? Does it help?

HOPELESSNESS:

(0)   absent

(1)   intermittently doubts that things will improve but can be reassured

(2)   more generally feels hopeless but accepts reassurance

(3)   expresses feelings of discouragement, despair, pessimism about future, which cannot be dispelled by reassurance

(4)   spontaneously and inappropriately perseverates, "I'll never get well" or the like.Nihilistic delusions

24. WORTHLESSNESS

In the past week, what has your opinion of yourself, compared to others, been like?

Have you felt that you aren't as good as most other people?

IF YES: How much of the time have you felt like this?
Have you felt completely worthless?

WORTHLESSNESS:

(0) absent

(1) Indicates mild feelings of worthlessness (low self-esteem) e.g., a little down on himself

(2) moderate: Indicates moderate feelings of worthlessness (loss of self-esteem) e.g., feels very bad about himself

(3) marked: Different from (2) by degree: patient feels that he is "no good," "inferior," etc., or describes himself as worthless.

(4) severe: Delusional notions of worthlessness (e.g., "I am a heap of garbage" or its equivalent)

HAMILTON RATING SCALE FOR ANXIETY (HRSA)

CIRCLE the answer to each question that best describes how the subject has been feeling over the **PAST WEEK**.

	None	Mild	Moderate	Severe	Very Severe
1. ANXIOUS MOOD (Worries, anticipation of the worst, fearful anticipation, irritability.)	0	1	2	3	4
2. TENSION (Feelings of tension, fatigability, startle response, moved to tears easily, trembling, feelings of restlessness, inability to relax.)	0	1	2	3	4
3. FEARS (Of the dark, strangers, being left alone, animals, traffic, crowds.)	0	1	2	3	4
4. INSOMNIA (Difficulty in falling asleep, broken sleep, unsatisfying sleep, fatigue on waking, dreams, nightmares, night terrors.)	0	1	2	3	4
5. INTELLECTUAL (COGNITIVE) (Difficulty in concentration, poor memory.)	0	1	2	3	4
6. DEPRESSED MOOD (Loss of interest, lack of pleasure in hobbies, depression, early waking, diurnal swing.)	0	1	2	3	4
7. SOMATIC (MUSCULAR) (Pains and aches, twitchings, stiffness, myoclonic jerks, grinding of teeth, unsteady voice, increased muscular tone.)	0	1	2	3	4
8. SOMATIC (SENSORY) (Tinnitus, blurring of vision, hot and cold flushes, feelings of weakness, prickling sensation.)	0	1	2	3	4
9. CARDIOVASCULAR SYMPTOMS (Tachycardia, palpitations, pain in chest, throbbing of vessels, fainting feelings, missing beats.)	0	1	2	3	4

	None	Mild	Moderate	Severe	Very Severe
10. RESPIRATORY SYMPTOMS (Pressure of constriction in chest, choking feelings, sighing, dyspnea.)	0	1	2	3	4
11. GASTROINTESTINAL SYMPTOMS (Difficulty in swallowing, passing gas, abdominal pain, burning sensations, abdominal fullness, nausea, vomiting, borborygmus, looseness of bowels, loss of weight, constipation.)	0	1	2	3	4
12. GENITOURINARY SYMPTOMS (Frequency of micturition, urgency of micturition, amenorrhea, menorrhagia, development of frigidity, premature ejaculation, loss of libido, impotence.)	0	1	2	3	4
13. AUTONOMIC SYMPTOMS (Dry mouth, flushing, pallor, tendency to sweat, giddiness, tension, headache, raising of hair on arms or legs, goose bumps.)	0	1	2	3	4
14. BEHAVIOR AT INTERVIEW (Fidgeting, restlessness or pacing, tremor of hands, furrowed brow, strained face, sighing or rapid respiration, facial pallor, swallowing, belching, brisk tendon jerks, dilated pupils, exophthalmos.)	0	1	2	3	4

TOTAL_____

BECK DEPRESSION INVENTORY - II (BDI-II)

Please read each group of statements carefully, then pick out the **one statement** in each group which best describes the way you have been feeling during the **past week, including today.** Circle the number beside the statement you have picked. If several statements in the group seem to apply equally well, simply circle the statement which has the largest number. Be sure that you do **not** circle more than one statement for Item 16 (change in sleeping pattern) and Item 18 (change in appetite.)

1   Sadness
   0   I do not feel sad.
   1   I feel sad much of the time.
   2   I am sad all the time.
   3   I am so sad or unhappy that I can't stand it.

2   Pessimism
   0   I am not discouraged about my future.
   1   I feel more discouraged about my future than I used to be.
   2   I do not expect things to work out for me.
   3   I feel my future is hopeless and will only get worse.

3   Past Failure
   0   I do not feel like a failure.
   1   I have failed more than I should have.
   2   As I look back, I see a lot of failures.
   3   I feel I am a total failure as a person.

4   Loss of Pleasure
   0   I get as much pleasure as I ever did from the things I enjoy.
   1   I don't enjoy things as much as I used to.
   2   I get very little pleasure from the things I used to enjoy.
   3   I can't get any pleasure from the things I used to enjoy.

5   Guilty Feelings
   0   I don't feel particularly guilty.
   1   I feel guilty over many things I have done or should have done.
   2   I feel quite guilty most of the time.
   3   I feel guilty all of the time.

6   Punishment Feelings
   0   I don't feel I am being punished.
   1   I feel I may be punished.
   2   I expect to be punished.
   3   I feel I am being punished.

7   Self Dislike
   0   I feel the same about myself as ever.
   1   I have lost confidence in myself.
   2   I am disappointed in myself.
   3   I dislike myself.

8   Self Criticalness
   0   I don't criticize or blame myself more than usual.
   1   I am more critical of myself than I used to be.
   2   I criticize myself for all of my faults.
   3   I blame myself for everything bad that happens.

9   Suicidal Thoughts or Wishes
   0   I don't have any thoughts of killing myself.
   1   I have thoughts of killing myself, but I would not carry them out.
   2   I would like to kill myself.
   3   I would kill myself if I had the chance.

10   Crying
   0   I don't cry any more than I used to.
   1   I cry more than I used to.
   2   I cry over every little thing.
   3   I feel like crying but I can't.

11 Agitation
0 I am no more restless or wound up than usual.
1 I feel more restless or wound up than usual.
2 I am so restless or agitated that it's hard to stay still.
3 I am so restless or agitated I have to keep moving or doing something.

12 Loss of Interest
0 I have not lost interest in other people or activities.
1 I am less interested in other people or things than before.
2 I have lost most of my interest in other people or things.
3 It's hard to get interested in anything.

13 Indecisiveness
0 I make decisions about as well as ever.
1 I find it more difficult to make decisions than usual.
2 I have much greater difficulty in making decisions than I used to.
3 I have trouble making any decisions.

14 Worthlessness
0 I do not feel I am worthless.
1 I don't consider myself as worthwhile or useful as I used to.
2 I feel more worthless as compared to other people.
3 I feel utterly worthless.

15 Loss of Energy
0 I have as much energy as ever.
1 I have less energy than I used to have.
2 I don't have enough energy to do very much.
3 I don't have enough energy to do anything.

16 Change in Sleeping Pattern
0 I have not experienced any change in my sleeping pattern.
1a I sleep somewhat more than usual.
1b I sleep somewhat less than usual.
2a I sleep a lot more than usual.
2b I sleep a lot less than usual.

3a I sleep most of the day.
3b I wake up 1-2 hours early and can't get back to sleep.

17 Irritability
0 I am no more irritable than usual.
1 I am more irritable than usual.
2 I am much more irritable than usual.
3 I am irritable all the time.

18 Change in Appetite
0 I have not experienced any change in my appetite.

1a My appetite is somewhat less than usual.
1b My appetite is somewhat greater that usual.

2a My appetite is much less than before.
2b My appetite is much greater than usual.

3a I have no appetite at all.
3b I crave food all the time.

19 Concentration Difficulty
0 I can concentrate as well as ever.
1 I can't concentrate as well as usual.
2 It's hard to keep my mind on anything for very long.
3 I find I can't concentrate on anything.

20 Tiredness or Fatigue
0 I am no more tired or fatigued than usual.
1 I get more tired or fatigued more easily than usual.
2 I am too tired or fatigued to do a lot of things I used to do.
3 I am too tired or fatigued to do most of the things I used to do.

21 Loss of Interest in Sex
0 I have not noticed any recent change in my interest in sex.
1 I am less interested in sex than I used to be.
2 I am much less interested in sex now.
3 I have lost interest in sex completely.

BECK ANXIETY INVENTORY (BAI)

Instructions: Please consider each item in the following list of symptoms carefully. Indicate **HOW MUCH** you have been bothered by each symptom during the **PAST WEEK, INCLUDING TODAY**, by circling the number in the corresponding column for each symptom.

		NONE It did not bother me at all.	**MILDLY** It did not bother me much.	**MODERATELY** It was very unpleasant but I could stand it.	**SEVERELY** I could barely stand it.
1.	Numbness or tingling	0	1	2	3
2.	Feeling hot	0	1	2	3
3.	Wobbliness in legs	0	1	2	3
4.	Unable to relax	0	1	2	3
5.	Fear of the worst happening	0	1	2	3
6.	Dizzy or lightheaded	0	1	2	3
7.	Heart pounding or racing	0	1	2	3
8.	Unsteady	0	1	2	3
9.	Terrified	0	1	2	3
10.	Nervous	0	1	2	3
11.	Feelings of choking	0	1	2	3
12.	Hands trembling	0	1	2	3
13.	Shaky	0	1	2	3
14.	Fear of losing control	0	1	2	3
15.	Difficulty breathing	0	1	2	3
16.	Fear of dying	0	1	2	3
17.	Scared	0	1	2	3
18.	Indigestion or discomfort in abdomen	0	1	2	3
19.	Faint	0	1	2	3
20.	Face flushed	0	1	2	3
21.	Sweating (not due to heat)	0	1	2	3

THE POSITIVE AND NEGATIVE AFFECT SCALE
(PANAS, WATSON, CLARK & TELLEGEN, 1988)
PLUS ADDITIONAL ITEMS FROM LARSEN & DIENER (1992)

This scale consists of a number of words that describe different feelings and emotions. Please indicate to what extent you feel this way RIGHT NOW. Use the following scale to record your answers.

1	2	3	4	5
very slightly or not at all	a little	moderately	quite a bit	extremely

1.	intense		18.	sad		**35.**	**enthusiastic PA**
2.	glad		**19.**	**excited PA**		36.	unhappy
3.	**hostile NA**		**20.**	**strong PA**		37.	stimulated
4.	relaxed		**21.**	**upset NA**		38.	quiet
5.	surprised		22.	still		**39.**	**afraid NA**
6.	**proud PA**		**23.**	**active PA**		40.	gloomy
7.	**interested PA**		24.	serene		**41.**	**jittery NA**
8.	**distressed NA**		25.	bored		42.	dull
9.	pleased		**26.**	**scared NA**		**43.**	**nervous NA**
10.	aroused		27.	happy		**44.**	**determined PA**
11.	delighted		**28.**	**attentive PA**		**45.**	**inspired PA**
12.	content		29.	calm		46.	passive
13.	**irritable NA**		30.	inactive		47.	tranquil
14.	tired		31.	sluggish		**48.**	**alert PA**
15.	miserable		32.	grouchy		**49.**	**guilty NA**
16.	**ashamed NA**		33.	cheerful			
17.	drowsy		34.	at ease			

Note: Original **PANAS items are bold**; the sub-scales are indicated following the individual items.

APPENDIX F

INSTRUCTIONS FOR THE SORTING TASK

In this sorting task, please assign every item of the attached scales to one of six categories. The categories are derived from the Mood and Anxiety Symptom Questionnaire (MASQ) and include:

> **(1) General Distress: Mixed Symptoms**
> **(2) General Distress: Anxious Symptoms**
> **(3) General Distress: Depressive Symptoms**
> **(4) Somatic Anxiety**
> **(5) Loss of Interest**
> **(6) High Positive Affect**

Carefully read the examples of anxiety and depression symptoms for these six categories. Then, assign each item of the measures HRSD, HRSA, BDI and BAI to the category which contains symptoms that most closely resemble the item. Many of the items are almost identical to the example symptoms in the categories, which makes the task fairly easy. However, be sure to consider all categories before assigning an item. Also, watch out for reversed key items. Those items may or may not best match with categories containing their reversed equivalents. For example, the hypothetical items "I ate a lot" and "I didn't eat a lot" may fit best with two different categories.

If you think an item fits two or more categories equally well, please list all categories. If an item does not fit any category well, either indicate the category it fits best and write "poor fit" next to your answer or simply write "0" in the blank next to that item. Comments are welcome!

Thank you for your help with this.

Sabine

**Category 1: General Distress:
Mixed Symptoms**
worried a lot about things
trouble concentrating
felt dissatisfied with things
felt confused
felt irritable
trouble making decisions
trouble paying attention
felt restless
felt something awful would happen

**Category 2: General Distress:
Anxious Symptoms**
felt tense, "high strung"
felt uneasy
felt nervous
felt afraid
felt "on edge", keyed up
unable to relax

**Category 3: General Distress:
Depressive Symptoms**
felt depressed
felt discouraged
felt sad
felt hopeless
disappointed in myself
felt like crying
felt like a failure
felt worthless
blamed myself for things
felt inferior to others
pessimistic about the future
felt tired and sluggish

Category 4: Somatic Anxiety
felt dizzy, lightheaded
was trembling, shaking
shaky hands
trouble swallowing
short of breath
dry mouth
twitching or trembling muscles

hot or cold spells
cold or sweaty hands
felt like I was choking
felt faint
pain in chest
racing or pounding heart
felt numbness or tingling
afraid I was going to die
had to urinate frequently

Category 5: Loss of Interest
felt nothing was enjoyable
nothing was interesting or fun

Category 6: High Positive Affect
felt really lively, "up"
felt really happy
felt I had a lot of energy
was having a lot of fun
felt I had much to look forward to
felt good about myself
I had many interesting things to do
felt confident
looked forward to things
felt I had accomplished a lot
was proud of myself
felt cheerful
felt successful
felt optimistic
felt really talkative
moved quickly and easily
felt hopeful about the future
able to laugh easily
felt like being with others
felt very clearheaded
thoughts came to me very easily
felt very alert
could do everything I needed to

REFERENCES

Alloy, L. B., Kelly, K. A., Mineka, S., & Clemens, C. M. (1990). Comorbidity in anxiety and depressive disorders: A helplessness-hopelessness perspective. In J. D. Maser & C. R. Cloninger (Eds.), *Comorbidity of Mood and Anxiety Disorders* (pp. 499-543). Washington, DC: American Psychiatric Press.

Alwin, D. F. & Jackson, D. J. (1981). Applications of simultaneous factor analysis to issues of factorial invariance. In D. Jackson & E. Borgatta (Eds.), *Factor analysis and measurement in sociological research: A multi-dimensional perspective* (pp. 249-279). Beverly Hills, CA: Sage.

American Psychiatric Association. (1980). *Diagnostic and statistical manual of mental disorders, third edition: DSM-III*. Washington, DC.

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders, fourth edition: DSM-IV*. Washington, DC.

Amin, Y., Daradkeh, T., Hamdi, E., & Abou-Saleh, M. (1999). The structure of the Hamilton Depression Rating Scale (HDRS-17): A confirmatory factor analysis. *Arab Journal of Psychiatry, 10*, 16-23.

Arbuckle, J. L. (1996). Full information estimation in the presence of incomplete data. In G. A. Marcoulides & R. E. Schumacker (Eds.), *Advanced structural equation modeling: Issues and techniques* (pp. 243 – 277). Mahwah, NJ: Lawrence Erlbaum Associates.

Arbuckle, J. L. (1999). Amos 4.0 [Computer software]. Chicago: Smallwaters.

Barlow, D. H. (1988). *Anxiety and Its Disorders: The Nature and Treatment of Anxiety and Panic.* New York: The Guilford Press.

Beck, J. (1995). *Cognitive Therapy: Basics and Beyond.* NY: The Guilford Press.

Beck, A. T. & Beamesderfer, A. (1974). Assessment of depression: The depression inventory. In P. Pichot (Ed.), *Modern Problems in Pharmacopsychiatry: Vol. 7. Psychological measurements in psychopharmacology* (pp. 151-169). Basel, Switzerland: Karger.

Beck, A. T., Emery, G., & Greenberg, A. L. (1985). *Anxiety Disorders and Phobias: A Cognitive Perspective.* USA: Basic Books.

Beck, A. T., Epstein, N., Brown, G. & Steer, R. A. (1988). An inventory for measuring clinical anxiety: Psychometric properties. *Journal of Consulting and Clinical Psychology, 56*, 893-897.

Beck, A. T., Rush, A. J., Shaw, B. F., & Emery, G. (1979). *Cognitive therapy of depression: A treatment manual.* New York: Guilford Press.

Beck, A. T. & Steer, R. A. (1987). *Manual for the Revised Beck Depression Inventory.* San Antonio, TX.: Psychological Corporation.

Beck, A. T. & Steer, R. A. (1990). *Manual for the Beck Anxiety Inventory.* San Antonio, TX.: Psychological Corporation.

Beck, A.T., Steer, R.A. & Brown, G.K. (1996). *Manual for the Beck Depression Inventory-II.* San Antonio, TX: Psychological Corp.

Beck, A. T., Steer, R. A. & Garbin, M. G. (1988). Psychometric properties of the Beck Depression Inventory: Twenty-five years of evaluation. *Clinical Psychology Review, 8,* 77-100.

Bentler, P. M. (1990). Comparative fit indexes in structural model. *Psychological Bulletin, 107*, 238-246.

Bentler, P. M. & Bonnett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin, 88*, 588-606.

Blackburn, I.-M. & Moore, R. G. (1997). Controlled acute and follow-up trial of cognitive and pharmacotherapy in out-patients with recurrent depression. *British Journal of Psychiatry, 171(10)*, 328-334.

Bodkin, J. A., Lasser, R. A., Wines, J. D., Gardner, D. M., & Baldessarini, R. J. (1997). Combining serotonin reuptake inhibitors and bupropion in partial responders to antidepressant monotherapy. *Journal of Clinical Psychiatry, 58,* 137-145.

Bourin, M., Chue, P., Guillon, Y. (2001). Paroxetine: a review. *CNS Drugs Review, 1*, 25-47.

Boyer, P., Tassin, J. P., Falissart, B. & Troy, S. (2000). Sequential improvement of anxiety, depression and anhedonia with sertraline treatment in patients with major depression. *Journal of Clinical Pharmacy and Therapeutics, 25*, 363-371.

Brown, T. A., Chorpita, B. F., & Barlow, D. H. (1998). Structural relationship among dimensions of the DSM-IV anxiety and mood disorders and dimensions of negative affect, positive affect, and autonomic arousal. *Journal of Abnormal Psychology, 107,* 179-192.

Burns, D. D. & Eidelson, R. J. (1998). Why are depression and anxiety correlated? A test of the tripartite model. *Journal of Consulting and Clinical Psychology, 66*, 461-473.

Carver, C. S., & White, T. L. (1994). Behavioral inhibition, behavioral activation, and affective responses to impending reward and punishment: The BIS/BAS scales. *Journal of Personality and Social Psychology, 67,* 319-333.

Chambless, D. L., & Gillis, M. M. (1996). Cognitive therapy of anxiety disorder. In K. S. Dobson & C. D. Kenneth (Eds.), *Advances in Cognitive-Behavioral Therapy, Vol.2* (pp. 116-144). Thousand Oaks, CA: Sage Publications.

Chorpita, B. (2002). The tripartite model and dimensions of anxiety and depression: An examination of structure in a large school sample. *Journal of Abnormal Child Psychology, 30*, 177-190.

Carmines, E. & McIver, J. (1981). Analyzing models with unobserved variables: Analysis of covariance structures. In G. Bohrnstedt & Borgatta (Eds.), *Social Measurement: Current Issues.* Beverly Hills, CA: Sage.

Clark, D. A., Steer, R. A., & Beck, A. T. (1994). Common and specific dimensions of self-reported anxiety and depression: Implications for the cognitive and tripartite models. *Journal of Abnormal Psychology, 103,* 645-654.

Clark, L. A. (1989). The anxiety and depressive disorders: Descriptive psychopathology and differential diagnosis. In P. C. Kendall & D. Watson (Eds.), *Anxiety and Depression: Distinctive and Overlapping Features* (pp. 83-129). San Diego: Academic Press.

Clark, L. A., & Watson, D. (1991). Tripartite model of anxiety and depression: Psychometric evidence and taxonomic implications. *Journal of Abnormal Psychology, 100 (3)*, 316-336.

Clark, L. A., Watson, D., & Mineka, S. (1994). Temperament, personality, and the mood and anxiety disorders. *Journal of Abnormal Psychology, 103,* 103-116.

Cole, D. A. (1987). Methodological contributions to clinical research: Utility of confirmatory factor analysis in test validation research. *Journal of Consulting and Clinical Psychology, 55*, 584-594.

Cook, J. M., Orvaschel, H., Simco, E., Hersen, M., & Joiner, T. (2004). A test of the tripartite model of depression and anxiety in older adult psychiatric outpatients. *Psychology and Aging, 19*, 444-451.

Danish University Antidepressant Group (1986): Paroxetine: a selective serotonin reuptake inhibitor showing better tolerance but weaker antidepressant effect than clomipramine in a controlled multicenter study. *Journal of Affective Disorders, 18*, 289-299.

Derogatis, L. R., Lipman, R. S., Covi, L. (1973). SCL-90: An outpatient psychiatric rating scale – preliminary report. *Psychopharmacology Bulletin, 9*, 13-28.

DeRubeis, R. J., Gelfand, L. A., Tang, T. Z., Simons, A. D. (1999). Medications versus cognitive behavioral therapy for severely depressed outpatients: mega-analysis of four randomized comparisons. *American Journal of Psychiatry, 156*, 1007-1013.

DeRubeis, R. J., Hollon, S. D., Amsterdam, J. D., Shelton, R. C., Young, P. R., Salomon, R. M., *O'Reardon, J. P., Lovett, M. L., Gladis, M. M., Brown, L. L., Gallop, R.* (2005). Cognitive Therapy versus Medications in the Treatment of Moderate to Severe Depression. *Archives of General Psychiatry, 62 (4)*, 409-41.

Dichter, G. S. (2001). *Anhedonia in Depression: A Review.* Major Area Paper Submitted to the Faculty of the Department of Psychology, College of Arts and Sciences, Vanderbilt University in partial fulfillment of the requirements for the degree of doctor of philosophy in psychology.

Dichter, G. S., Tomarken, A. J., Freid, C. M., Addington, S., & Shelton,-R. C. (2005). Do venlafaxine XR and paroxetine equally influence negative and positive affect? *Journal of Affective Disorders, 85 (3),* 333-339.

Dobson, K. S. (1989). A meta-analysis of the efficacy of cognitive therapy for depression. *Journal of Consulting and Clinical Psychology, 57,* 414-419.

Dozois, D. J.-A. (2003). The psychometric characteristics of the Hamilton Depression Inventory. *Journal of Personality Assessment, 80*, 31-40.

Dunbar, G. C., Cohn, J. B., Fabre, L. F., Feighner, J. P., Fieve, R. R., Mendels, J., & Shrivastava, R. K. (1991). A comparison of paroxetine, imipramine and placebo in depressed outpatients. *British Journal of Psychiatry, 159*, 394-398.

Duncan , T. E., Duncan, S. C., Strycker, L. A., Li, F., Alpert, A. (1999). An Introduction to Latent Variable Growth Curve Modeling: Concepts, Issues, and Applications. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Enns, M. W., Cox, B. J., Parker, J. D. A., & Guertin, J. E. (1998). Confirmatory factor analysis of the Beck Anxiety and Depression Inventories in patients with major depression. *Journal of Affective Disorders, 47,* 195-200.

Fawcett, J. (1997). The detection and consequences of anxiety in clinical depression. *Journal of Clinical Psychiatry, 58 (suppl. 8)*, 35-40.

Feighner, J. P. (1999). Overview of antidepressants currently used to treat anxiety disorders. Review. *Journal of Clinical Psychiatry, 60 (suppl. 22)*, 18-22.

Feighner, J. P. and Boyer, W. F. (1989). Paroxetine in the treatment of major depression. *Acta Psyciatrica Scandinavia, 80*, 125-129.

Feldman Barrett, L. and Russell, J. A. (1998). Independence and bipolarity in the structure of current affect. *Journal of Personality and Social Psychology, 74,* 967-984.

Fydrich, T., Dowdall, D., & Chambless, D. L. (1990). *Aspects of reliability and validity for the Beck Anxiety Inventory*. Paper presented at the National Conference on Phobias and Related Anxiety Disorders, Bethesda, MD.

First, M. B., Spitzer, R. L., Gibbon, M., & Williams, J. B. W. (1994). *Structured Clinical Interview for DSM-IV Axis I Disorders, Patient Edition.* Washington, DC: American Psychiatric Press.

Fleck, M. P., Poirier-Littre, M. F., Guelfi, J. D., Bourdel, M. C., & Loo, H. (1995). Factorial structure of the 17-item Hamilton Depression Rating Scale. *Acta Psychiatrica Scandinavia, 92*, 168-172.

Fowles, D. C. (1988). Psychophysiology and psychopathology: A motivational approach. *Psychophysiology, 25(4),* 373-391.

Fowles, D. C. (1994). A Motivational Theory of Psychopathology. In W. D. Spalding (Ed.) *Integrative Views of Motivtion, Cognition, and Emotion. Vol. 41 of the Nebraska Symposium of Motivation. Lincoln:* University of Nebraska Press.

Gitlin, M. J. (2002). Pharmacological treatment of depression. In J. H. Gotlib & C. L. Hammen (Eds.). *Handbook of Depression* (pp. 360-382). New York, NY: The Guilford Press.

Gjerris, A., Bech, P., Bøjholm, S., Bolwig, T. G., Kramp, P., Clemmesen, L., Andersen, J., Jensen, E., & Rafaelsen, O. J. (1983). The Hamilton Anxiety Scale: evaluation of homogeneity and inter-observer reliability in patients with depressive disorders. *Journal of Affective Disorders, 5,*163-170.

Gloaguen, V., Cottraux, J., Cucherat, M., & Blackburn, I.-V. (1998). A meta-analysis of the effect of cognitive therapy in depressed patients. *Journal of Affective Disorders, 49*, 59-72.

Gray, J. A. (1982). *The Neurobiology of Anxiety: An enquiry into the functions of the septo-hippocampal system.* Oxford: Clarendon Press.

Green, D. P., Goldman, S. L. & Salovey, P. (1993). Measurement error masks bipolarity in affect ratings. *Journal of Personality and Social Psychology, 64*, 1029-1041.

Greist, J. H., Jefferson, J. W., Kobak, K. A., et al. (1995). Efficacy and tolerability of serotonin transport inhibitors in obsessive compulsive disorder: a meta-analysis. *Archives of General Psychiatry, 52,* 53-60.

Grunhaus, L., Harel, Y., Krugler, T., Pande, A., & Haskett, R. (1988). Major depressive disorder and panic disorder: Effects of comorbidity on treatment outcome with antidepressant medications. *Clin Neuropharmacol, 11*, 454-461.

Hamilton, M. (1959). The assessment of anxiety states by rating. *British Journal of Medical Psychology, 32,* 50-55.

Hamilton, M. (1960). A rating scale for depression. *Journal of Neurology, Neurosurgery and Psychiatry, 23,* 56-65.

Hancock, G. R., Kuo, W.-L,, Lawrence, F. R. (2001). An illustration of second-order latent growth models. *Structural Equation Modeling, 8*, 470-89.

Hautzinger, M., de Jong-Meyer, R., Treiber, R. & Rudolf, G. A. (1996). the efficacy of cognitive behaviour therapy and pharmacotherapy, alone or in combination, in nonendogenous unipolar depression (in German). Zeitschrift fuer Klinische Psychologie. *Forschung und Praxis, 25*, 130-145.

Hedeker, D. & Gibbons, R. (1997). Application of random effects pattern mixture models for missing data in social sciences, *Psychological Methods, 2(1)*, 64-78.

Hirschfeld, R. M. A. (1999). Efficacy of SSRIs and newer antidepressants in severe depression: comparison with TCAs. *Journal of Clinical Psychiatry, 60*, 326-335.

Hollon, S. D., DeRubeis, R. J., Shelton, R. C., Amsterdam, J.D., Salomon, R. M., O'Reardon, J. P., Lovett, M. L., Young, P. R., Haman, K. L., Freeman, B. B., & Gallop, R. (2005). Prevention of Relapse following Cognitive Therapy versus Medications in Moderate to Severe Depression. *Archives of General Psychiatry, 62 (4)*, 417-422.

Hollon, S. D., Haman, K. L., & Brown, L. L. (2002). Cognitive-behavioral treatment of depression. In J. H. Gotlib & C. L. Hammen (Eds.). *Handbook of Depression* (pp. 383-403). New York, NY: The Guilford Press.

Hollon, S. D. & Shelton, R. C. (2001). Treatment guidelines for major depressive disorder. *Behavior Therapy, 32*, 235-258.

Hollon, S. D., Shelton, R. C., & Loosen, P. T. (1991). Cognitive therapy and pharmacotherapy for depression. *Journal of Consulting and Clinical Psychology, 59,* 88-99.

Hue, L. & Bentler, P. M. (1998). Fit indices in covariance structure modeling: Sensitivity to underparameterized model misspecification. *Psychological Methods, 3,* 424-453.

Jacques, H.-A. K. & Mash, E. J. (2004). A test of the tripartite model of anxiety and depression in elementary and high school boys and girls. *Journal of Abnormal Child Psychology, 32*, 13-25.

Jacobson, N. S., Martell, C. R., & Dimidjian, S. (2001). Behavioral activation treatment for depression: Returning to contextual roots. *Clinical Psychology: Science and Practice, 7(2)*, 203-218.

Joiner, T. E. Jr., Catanzaro, S. J., & Laurent, J. (1996). Tripartite structure of positive and negative affect, depression, and anxiety in child and adolescent psychiatric inpatients. *Journal of Abnormal Psychology, 105,* 401-409.

Joiner, T. E., Steer, R. A., Beck, A. T., Schmidt, N. B., Rudd, M. D., & Catanzaro, S. (1999). Physiological hyperarousal: Construct validity of a central aspect of the tripartite model of depression and anxiety. *Journal of Abnormal Psychology, 108,* 290-299.

Keltner, D. & Ekman, P. (2000). Facial expressions of emotion. In M. Lewis & J. M. Haviland (Eds.), Handbook of Emotions (2nd Ed., pp. 236-249). New York: Guilford.

Kessler, R. C., Nelson, C. B., McGonagle, K. A., Liu, J., Swartz, M., & Blazer, D. G. (1996). Comorbidity of DSM-III-R major depressive disorder in the general population: Results from the US National Comorbidity Survey. *British Journal of Psychiatry, 168 (suppl. 30),* 17-30.

Klein, D. F. (2000). Flawed meta-analyses comparing psychotherapy with pharmacotherapy. *American Journal of Psychiatry, 157*, 1204-1211.

Knutson, B., Wolkowitz, O. M., Cole, S. W., Chan, T., Moore, E. A., Johnson, R. C., Terpstra, J., Turner, R. A., Reus, V. I. (1998). Selective alteration of personality and social behavior by serotonergic intervention. *American Journal of Psychiatry, 155(3)*, 373- 379.

Lambert, S. F., McCreary, B. T., Joiner, T. E., Schmidt, N. B., & Ialongo, N. S. (2004). Structure of anxiety and depression in urban youth: An examination of the tripartite model. *Journal of Consulting and Clinical Psychology, 72*, 904-908.

Lammers, C. H., Diaz, J., Schwartz, J. C., & Sokoloff, P. (2000). Selective increase of dopamine D3 receptor gene expression as a common effect of chronic antidepressant treatments. *Molecular Psychiatry, 5(4)*, 378-388.

Lang, P. J., Bradley, M. M. & Cuthbert, B. N. (1998). Emotion, motivation, and anxiety: brain mechanisms and psychophysiology. *Biological Psychiatry, 44*, 1248-1263.

Lang, P. J., Davis, M. & Öhman, A. (2000). Fear and anxiety: animal models and human cognitive psychophysiology. *Journal of Affective Disorders, 61*, 137-159.

Larsen, R. J., & Diener, E. (1992). Promises and problems with the circumplex model of emotion. In M. Clark (Ed.), *Review of Personality and Social Psychology: Emotion,* Vol.13, 25-59. Newbury Park, California: Sage Publications.

Loehlin, J. C. Latent Variable Models: *An Introduction to Factor, Path, and Structural Equation Analysis (4th Ed.)*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Lovibond, S. H., & Lovibond, P. F. (1995). *Manual for the Depression Anxiety Stress Scales* (2nd ed.). Sydney, Australia: Psychological Foundation of Australia.

MacCallum, R. C., Browne, M. W., & Sugawara, H. M. (1996). Power analysis and determination of sample size for covariance structure modeling. *Psychological Methods, 1*, 130-149.

MacCallum, R. C., Wegener, D. T., Uchino, B. N., & Fabrigar, L. R. (1993). The problem of equivalent models in applications of covariance structure analysis. *Psychological Bulletin, 114*, 185-199.

McArdle, J. J. (1988). Dynamic but structural equation modeling of repeated measures data. In R. B. Cattell & J. Nesselroade (Eds.), *Handbook of Multivariate Experimental Psychology* (2nd ed., pp. 561-614). New York: Plenum Press.

Maier, W., Phillipp, M., & Gerken, A. (1985). Dimensionen der Hamilton-Depressionsskala (HAMD). Faktorenanalytische Untersuchungen. *European Archives of Psychiatry and Neurological Sciences, 234*, 417-422.

Mandell, M. (1987). Changes in components of syndrome depression associated with cognitive therapy, pharmacotherapy, and combined cognitive therapy and pharmacotherapy. *Dissertation submitted to the Graduate School at the University of Minnesota*.

Marcos, T. & Salamero, M. (1990). Factor study of the Hamilton Rating Scale for Depression and the Bech Melancholia Scale. *Acta Psychiatrica Scandinavica, 82*,178-181.

Marshall, G. N., Sherbourne, C. D., Meredith, L. S., Camp, P., & Hays, R. D. (2003). The tripartite model of anxiety and depression: Symptom structure in depressive and hypertensive patient groups. J*ournal of Personality Assessment, 80,* 139-153.

Martell, C. R., Addis, M. E., & Jacobson, N. S. (2001). *Depression in context: Strategies for guided action*. New York: W. W. Norton and Co, Inc.

Mineka, S., Watson, D., & Clark, L. A. (1998). Comorbidity of anxiety and unipolar mood disorders. *Annual Review of Psychology, 49,* 377-412.

Muthén , B. & Curran, P. (1997). General growth modeling of individual differences in experimental designs: A latent variable framework for analysis and power estimation. *Psychological Methods, 2*, 371-402.

O'Brien, K. P. & G. V. (1988). Factorial structure and factor reliability of the Hamilton Rating Scale for Depression. *Acta Psychiatrica Scandinavica, 78*, 113-120.

Onega, L. L., Abraham, I.-L. (1997). Factor structure of the Hamilton Rating Scale for Depression in a cohort of community-dwelling elderly. *International Journal of Geriatric Psychiatry, 12*, 760-764.

Pancheri, P., Picardi, A., Pasquini, M., Gaetano, P., & Biondi, M. (2002). Psycho-pathological dimensions of depression: A factor study of the 17-item Hamilton Depression Rating Scale in unipolar depressed outpatients. *Journal-of-Affective-Disorders, 68*, 41-47.

Pande, A., Birkett, M., Fechner-Bates, S., Haskett, R. F. & Greden, J. F. (1996). Fluoxetine versus phenelzine in atypical depression. *Biological Psychiatry, 40*, 1017-1020.

Perry, P. (1996). Pharmacotherapy for major depression with melancholic features: relative efficacy of tricyclic versus selective serotonin reuptake inhibitor antidepressants. *Journal of Affective Disorders, 39*, 1-6.

Quitkin, F. M., Stewart, J. W., McGrath, P. J., Tricamo, E., Rabkin, J. G., Ocepek-Welikson, K., Nunes, E., Harrison, W., Klein, D. F. (1993). Columbia atypical depression: a subgroup of depressives with better response to MAOI than to tricyclic antidepressants or placebo. *British Journal of Psychiatry Supplement, 21*, 30-34.

Raudenbush, S. & Bryk, A. (2002). *Hierarchical Linear Models: Applications and Data Analysis Methods, 2nd edition*. Thousand Oaks, CA: Sage Publications.

Ravindran, A. V., Judge, R., Hunter, B. N. and Bray, J. (1997). A double-blind, multicenter study in primary care comparing paroxetine and clomipramine in patients with depression and associated anxiety. *Journal of Clinical Psychiatry, 58 (3)*, 112-118.

Riskind, J. H., Beck, A. T., Brown, G., & Steer, R. A. (1987). Taking the measure of anxiety and depression: Validity of the reconstructed Hamilton scales. *Journal of Nervous and Mental Disease, 175 (8)*, 474-479.

Robinson, L., Berman, J. & Neimeyer, R. (1990). Psychotherapy for the treatment of depression: a comprehensive review of controlled outcome research. *Psychological Bulletin, 108*, 30-49.

Roose, S. P., Glassman, A. H., Attia, E., Woodring, S. (1994). Comparative efficacy of selective serotonin reuptake inhibitors and tricyclics in the treatment of melancholia. *American Journal of Psychiatry, 151*, 1735-1739.

Rush, A. J., Gullion, C. M., Brasco, M. R., Jarrett, R. B. & Trivedi, M. H. (1996). The inventory of depressive symptomatology (IDS): Psychometric properties. *Psychological Medicine, 26*, 477-486.

Sheehan, D., Dunbar, G. C. and Fuell, D. L. (1992). The effect of paroxetine on anxiety and agitation associated with depression. *Psychopharmacology-Bulletin, 28 (2)*, 139-143.

Shelton, R. C. & Tomarken, A. J., 2001. Can recovery from depression be achieved? *Psychiatric Services, 52*, 1469-78.

Sherbourne, C. D. and Wells, K. B. (1997). Course of depression in patients with comorbid anxiety disorders. *Journal of Affective Disorders, 43 (3)*, 245-250.

Steer, R. A., Clark, D. A., Beck, A. T., & Ranieri, W. F. (1995). Common and specific dimensions of self-reported anxiety and depression: A replication. *Journal of Abnormal Psychology, 104,* 542-545.

Steiger, J. H. & Lind, J. C. (1980, May). *Statistically based tests for the number of common factors.* Paper presented at the annual meeting of the Psychometric Society, Iowa City, IA.

Tanaka, J. S. & Hubs, G. J. (1984). Confirmatory hierarchical factor analyses of psychological distress measures. *Journal of Personality and Social Psychology, 46,* 621-635.

Thase, M. E. (2000). Treatment of severe depression. *Journal of Clinical Psychiatry, 61*, 17-25.

Thase, M. E., Frank, E., Mallinger, A. G., Hamer, T., Kupfer, D. J. (1992). Treatment of imipramine-resistant recurrent depression, III: Efficacy of monoamine oxidase inhibitors. *Journal of Clinical Psychiatry, 53*, 5-11.

Tellegen, A. (1982). *Brief manual for the Multidimensional Personality Questionnaire*. Unpublished manuscript. University of Minnesota, Minneapolis.

Tellegen, A. (1985). Structures of mood and personality and their relevance to assessing anxiety, with an emphasis on self-report. In A. H. Tuma & J. D. Maser (Eds.), *Anxiety and Anxiety Disorder* (pp. 681-706). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.

Tellegen, A., Watson, D., & Clark, L. A. (1999). On the dimensional and hierarchical structure of affect. *Psychological Science, 10,* 297-303.

Tisak, J. & Meredith, W. (1990). Descriptive and associative developmental models. In A. von Eye (Ed.), *Statistical Methods in Developmental Research* (Vol. 2, pp.387-406). San Diego, CA: Academic Press.

Trivedi, M. H., Rush, R. M., Bolden-Watson, C., Houser, T. L. & Metz, A. (2001). Do bupropion SR and sertraline differ in their effects on anxiety in depressed patients? *Journal of Clinical Psychiatry, 62*, 776-81.

Tomarken, A. J., Dichter, G. S., Freid, C., Addington, S., & Shelton, R. C. (2004). Assessing the effects of bupropion SR on mood dimensions of depression. *Journal of Affective Disorders*.

Tomarken, A. J. & Waller, N. G. (2003). Potential problems with "well fitting" models. *Journal of Abnormal Psychology, 112*, 578-598.

Tucker, L. R. & Lewis, C. (1973). A reliability coefficient for maximum likelihood factor analysis. *Psychometrika, 38*, 1-10.

Turner, C. M. & Barrett, P. M. (2003). Does age play a role in structure of anxiety and depression in children and youths? An investigation of the tripartite model in three age cohorts. *Journal of Consulting and Clinical Psychology, 71*, 826-833.

Vaswani, M., Linda, F. K. & Ramesh, S. (2003). Role of selective serotonin reuptake inhibitors in psychiatric disorders: a comprehensive review. *Progress in Neuro-Psychopharmacology & Biological Psychiatry, 27*, 85-102.

Watson, D., Clark, L. A., & Carey, G. (1988). Positive and negative affectivity and their relation to anxiety and depressive disorders. *Journal of Abnormal Psychology, 97,* 346-353.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: the PANAS scales. *Journal of Personality and Social Psychology, 54,* 1063-1070.

Watson, D., & Tellegen, A. (1985). Toward a consensual structure of mood. *Psychological Bulletin, 98,* 219-235.

Watson, D. & Vaidya, J. (2003). Mood measurement: current status and future directions. In J. A. Schinka & W. F. Velicer (Eds.), *Handbook of Psychology: Research Methods in Psychology, Vol. 2* (pp. 351-375). New York, NY: John Wiley & Sons, Inc.

Watson, D., Clark, L. A., Weber, K., Assenheimer, J. S., Strauss, M. E. & McCormick, R. A., (1995a). Testing a tripartite model: II. Exploring the symptom structure of anxiety and depression in student, adult, and patient samples. *Journal of Abnormal Psychology, 104*, 15-25.

Watson, D., Weber, K, Assenheimer, J. S., Clark, L. A., Strauss, M. E., & McCormick, R. A. (1995b). Testing a tripartite model: I. Evaluating the convergent and discriminant validity of anxiety and depression symptom scales. *Journal of Abnormal Psychology, 104,* 3-14.

Watson, D., Wiese, D., Vaidya, J. & Tellegen, A. (1999). The two general activation systems of affect: structural findings, evolutionary considerations, and psychobiological evidence. *Journal of Personality and Social Psychology, 76,* 820-838.

Wheaton, B., Muthén, B., Alwin, D., & Summers, G. (1977). Assessing reliability and stability in panel models. In D. Heise (Ed.), *Sociological Methodology*. San Francisco: Jossey-Bass.

Willet, J. B. & Sayer, A. G. (1994). Using covariance structure analysis to detect correlates and predictors of individual change over time. *Psychological Bulletin, 116*, 363-381.

Williams, J. B. W. (1988). A structured interview guide for the Hamilton Depression Rating Scale. *Archives of General Psychiatry, 45,* 742-747.

Zinbarg, R. E., Barlow, D. H., Liebowitz, M., Street, L., Broadhead, E., Katon, W., Roy-Byrne, P., Lepine, J., Teherani, M., Richards, J., Brantley, P. J. & Kraemer, H.(1994). The DSM-IV field trial for mixed anxiety-depression. *American Journal of Psychiatry, 151*, 1153-1162.